

Orthostatic Vital Signs

Katie Martin BSN, RN
Lehigh Valley Health Network

Amanda Penna BSN, RN
Lehigh Valley Health Network

Allyson Stettler BSN, RN
Lehigh Valley Health Network

Jennifer Towler BSN, RN
Lehigh Valley Health Network

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UTILIZING ORTHOSTATIC VITAL SIGNS AS AN INDICATOR OF FALL RISK

Allyson Stettler, BSN, RN

Amanda Penna, BSN, RN

Jennifer Towler, BSN, RN

Katie Martin, BSN, RN

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Definition

- Orthostatic hypotension is defined as a decrease in 20 mmHg (or more) in systolic blood pressure, or a decrease of 10 mmHg (or more) in diastolic blood pressure, with a change in position (Irvin, J.D., White, M. (2004)).

Background/Significance

- Patient falls can lead to serious injury
- Patient falls occur network wide
- Orthostatic hypotension is a significant risk factor for falls
- Elderly, prolonged bed rest patients, patients with a history of diabetes, cardiovascular disease, hypertension, autonomic nervous system disorders and endocrine disorders are all at risk for orthostatic hypotension and falls

PICO QUESTION

- PICO Question – To identify the percentage of patients that demonstrate orthostasis on admission or initial ambulation on progressive and medical/surgical units in comparison to current practice.
- P- Admission and initial ambulation of patients on TOHU, RHC-M, 4K and 7A
- I- Orthostatic vital signs on admission to unit and initial ambulation post-procedure
- C- Current Practice
- O- Percentage of patients that demonstrate orthostasis

TRIGGER?

- Knowledge v. Problem
 - Problem
 - Patient falls occur network wide
 - Risk management
 - Patient falls can lead to serious injury or even death
 - Identification of clinical problem
 - Fall precautions and fall assessment of patients

EVIDENCE

- Search engines- CINAHL, EBSCO, Nursing consults, OVID, National Guidelines Clearinghouse
- Key words- orthostatic vital signs, orthostasis, fall risk, falls, post-procedure
- 11 articles were utilized to provide background on orthostasis and fall risk, 7A orthostatic policy was also utilized to provide information and guide project

Evidence Table

STUDY (Author, Study Name, Journal, Year)	METHODS	SETTING/ POPULATION	INTERVENTION	OUTCOME MEASURES	FINDINGS	LEVEL of EVIDENCE
<p>Lanier, Jeffrey, B., Mote, Matthew B., Clay, Emily, C.</p> <p>Evaluation and Management of Orthostatic Hypotension.</p> <p>American Family Physician Website www.aafp.org/afp 2011</p>	<p>Literature Review</p>	<p>Review of Evaluation and Management of Orthostatic Hypotension</p> <p>Acute care and outpatient settings</p>	<p>Provided an overview of differential diagnosis of orthostatic hypotension, treatment options(pharmacologic and nonpharmacologic)</p>	<p>Literature review</p>	<p>Orthostatic hypotension results from an inadequate physiologic response to postural changes in blood pressure. Evaluation of suspected orthostatic hypotension begins by identifying reversible causes and underlying associated medical conditions. Treatment includes correcting reversible causes and discontinuing responsible medications.</p>	<p>V</p>
<p>Preventing Falls in Hospitals Toolkit: A Toolkit for Improving Quality of Care. Rockville, MD: Agency for Healthcare Research and Quality; 2013. http://www.ahrq.gov/professionals/systems/long-term-care/resources/injuries/fallpreventionkit/index.html</p>	<p>Systematic review of the literature & Expert opinion about best practices, provided input on key aspects of care and implementation strategies. Six hospitals tested the toolkit as part of the project and their feedback influenced the final version.</p>	<p>Toolkit focuses on falls that occur in the hospital</p>	<p>Toolkit (implementation guide) organized under 6 major questions:</p> <ul style="list-style-type: none"> • Are you ready for this change? • How will you manage change? • Which fall prevention practices do you want to use? • How do you implement the fall prevention program in your organization? • How do you measure fall rates and fall prevention practices? • How do you sustain an effective fall prevention program? 	<p>Improvements in safety and quality across an organization (decrease in fall rate)</p>	<p>Quality improvement changes need to be woven into the day-to-day fabric of operations Attaining linear improvements in safety and quality across an organization is not a linear process. On an average, organizations require about a year to develop, incorporate and consolidate new fall prevention practices Safety improvements are fostered by learning environments that promote teamwork, communication, respect for a range of expertise and sustainability of effort.</p>	<p>III</p>

Evidence Table

STUDY (Author, Study Name, Journal, Year)	METHODS	SETTING/ POPULATION	INTERVENTION	OUTCOME MEASURES	FINDINGS	LEVEL of EVIDENCE
<p>National Guideline Clearinghouse, Falls and fall risk in the long-term care setting. Agency for Healthcare Research and Quality, 2003</p> <p>Irvin, J.D., White, M. The importance of accurately assessing orthostatic hypotension. Geriatric Nursing. 2004</p>	<p>Search of electronic databases Expert consensus Review External peer review Internal peer review</p> <p>Literature review</p>	<p>Elderly residents of long-term care facilities</p> <p>Nursing home residents, inpatient geriatric patients, pt with Parkinson's, young healthy subjects, pt. with orthostatic hypotension, normotensive and hypertensive patients</p>	<p>Major recommendations guidelines steps 1-10</p> <p>Have patients lie supine 10 min then check BP and HR</p> <p>Check BP and HR immediately after sitting upright and ask about dizziness</p> <p>Sit upright 3 min and check BP and HR again</p>	<p>Review</p> <p>Literature review</p>	<p>Utilize the 10 step guidelines to identify fall risk, Implement through audit, criteria indicators, clinical algorithms, pt. resources and tool kits can help to reduce falls</p> <p>Techniques, timing and positioning contribute to accurate orthostatic hypotension assessment. Should be included in orientation program.</p>	
<p>Xin, W., Lin, Z., Mi, S. Orthostatic hypotension and mortality risk; a meta-analysis of cohort studies. Heart. 2014</p>	<p>Meta-analysis</p>	<p>Adult population >18 years of age</p>	<p>Used 10published articles based on nine cohort studies with 56,125 participants, 11,580 mortality cases were included.</p>	<p>6 of the 9 studies showed significant association between orthostatic hypotension and increased mortality risk, 3 did not show any correlation.</p>	<p>Presence of orthostatic hypotension is associated with increased risk of all-cause mortality, can be partially mediated by classic risk factors. Further research is needed to determine if the risk between orthostatic hypotension and mortality is casual.</p>	

Evidence Table

<p>Graafmans, C.W., Ooms, E. M., Hofstee A. H., Bezemer, D. P., Bouter M. L., Lips, P. Falls in the elderly: A prospective study of risk factors and risk profiles. American Journal of Epidemiology. 1996</p>	<p>Prospective study</p>	<p>458 men and women living in 13 homes or apartments houses for the elderly in amsterdardam</p>	<p>Had participants record any falls during a 28 week period. Every 2 months questionnaires and tests were utilized to determine medical history, mobility impairment, cognitive function and postural blood pressure changes.</p>	<p>251 falls were reported by 126 participants, at least two falls were reported by 57 participants, 26 reported having at least 3 falls. Most falls occurred indoors and between 8am-10am and 1pm-3pm. 22% of participants demonstrated orthostatic hypotension</p>	<p>History of postural hypotension was related to recurrent falls. Orthostatic hypotension was considered a significant risk factor for falls.</p>	
<p>2011 ENA Emergency Nursing Resources Development Committee. Naccarto, Mary, Leviner, S., Proehl, J., Barnason, S., Brim, C., Crowley, M., Lindauer, C., Storer, A., Williams, J., Emergency Nursing Resources: Orthostatic Vital Signs Journal of Emergency Nursing, 2012</p>	<p>Literature Review</p>	<p>Inpatients; Emergency Room</p>	<p>Variations in empirical evidence on several aspects of obtaining and interpreting orthostatic vital signs</p>	<p>Literature Review</p>	<p>Variations in practice which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from recommendations</p>	<p>V</p>
<p>Dingle, M. Role of dangling when moving from supine to standing position British Journal of Nursing, 2003</p>	<p>Literature review</p>	<p>Review of 15 articles focusing on physiology of cardiovascular system with orthostatic hypotension, the postural changes with orthostatic hypotension and treatment and recommendation of orthostatic hypotension</p>	<p>The physiological response of the body when changing from laying to sitting and standing positions. Use of dangling to see if an individual will tolerate the position change.</p>	<p>Literature review</p>	<ul style="list-style-type: none"> • Orthostatic intolerance may be experienced by some individuals when moving from the supine to the standing position, leading to a reduction in blood pressure. This may cause dizziness, nausea, and even fainting • Those at particular risk include people who have been on prolonged bed rest, elderly people, and those with diabetes and cardiovascular disease • Some pharmacological agents may also increase the risk of orthostatic intolerance • Dangling is an intermediary stage of assisting people into the standing position from the supine position to minimize any reduction in blood pressure 	<p>VIII</p>

Evidence Table

<p>Lance, R., Link, M., Padua, M., Clavell, L., Johnson, G., Knebel, A. Comparison of different methods of obtaining orthostatic vital signs Clinical Nursing Resource Vol 9, No 4. Nov, 2004</p>	<p>Randomized crossover design</p>	<p>Review of 35 patients ages 19-40 with no history of cardiovascular disease, irregular pulse, pregnancy or medications that effect blood pressure</p>	<p>Comparison of two lying and standing procedures for measuring orthostatic vital signs. Measurements of blood pressure, heart rate and dizziness were collected</p>	<p>Vitals obtained after 5 minutes of moderate exercise, then lying supine for 5 minutes. Measurements obtained prior to rising, immediately upon standing and two minutes after standing. Measurements also obtained after lying supine for 10 and 15 minutes</p>	<ul style="list-style-type: none"> • Mean SBP at 5 minutes is 113.8. At 10 minutes is 109.3 and at 15 is 109.4 with an overall F value of 16.50 and P value of <.0001 • At least 10-15 minutes of lying flat is needed to stabilize blood pressure prior to standing for measurement.
<p>Clinical Practice Guidelines. Fall/Trauma/Injury Risk CPM resource center , 2013</p>	<p>Clinical practice guidelines</p>	<p>Infants, children, adolescent, adult and geriatric populations</p>	<p>Correlate safety and Risk for falls to history of falls and presence of orthostatic or postural hypotension. Determine risk factors for orthostais</p>	<p>Clinical Practice Guidelines</p>	<ul style="list-style-type: none"> • Determine risk factors for orthostasis by assessing patient history
<p>Mager, D.R. Orthostatic hypotension: Pathophysiology, problems and prevention Home Health Nurse Vol 30 No 9 Oct 2012</p>	<p>Descriptive study</p>	<p>Patients in the home care setting</p>	<p>Assessing for orthostatic vital signs, acknowledging risk factors and signs and symptoms. Determining risk for falls.</p>	<p>The severity of symptoms associated with orthostatic hypotension</p>	<ul style="list-style-type: none"> • Causes of OH such as cardiac medications, autonomic nervous system disorders, fluid displacement, standing too fast and uncontrolled hypertension • Implications- utilize orthostatic vital signs when assessing fall risk • Focus on pt education on prevention and treatment.
<p>Gray-Miceli, D., Ratcliffe, J. S., Liu, S., Wantland, D., Johnson, J. Orthostatic hypotension in older nursing home residents who fall: Are they dizzy? Clinical Nurse Research. 2012</p>	<p>Secondary descriptive analysis</p>	<p>77 residents who experience falls from a 110 bed continuing care retirement community</p>	<p>RN's completed a post fall index (PFI). When a fall occurred RN's looked at past medical history, medications, symptoms of dizziness, lightheadedness, fainting, loss of balance, presence of orthostatic hypotension, and assessment of fall causes.</p>	<p>117 falls made by 59 residents were included in results. 18 falls met the criteria for orthostatic hypotension, 8 falls were within 4 points of meeting the criteria for orthostatic hypotension.</p>	<p>The 18 falls associated with orthostatic hypotension the residents did not report dizziness, lightheadedness or fainting. 9 of the 18 reported loss of balance. Study indicates that falls related to orthostatic hypotension are not associated with symptoms of dizziness, lightheadedness or fainting.</p>

Evidence Table

<p>Naccarato, M., Leviner, S., Proehl, J., Barnason, S., Brim, C., Crowley, M., Lindauer, C., Storer, A., Williams, J. Clinical Practice Guidelines: Orthostatic Vital Signs. Emergency Nurses Association. 2011</p>	<p>Literature Review</p>	<p>ED and non-ED setting,</p>	<p>Definition of orthostatic hypotension, body positioning and timing, sensitivity to fluid volume loss, syncope symptoms and shock index, equipment used, and patient safety while obtaining orthostatic vital signs.</p>	<p>Literature Review</p>	<p>Changes in blood pressure and heart rate were more pronounced after a longer rest period, 5 min or greater is recommended. Legs should be uncrossed and arm supported while taking blood pressure and heart rate Orthostatic vital signs should not be measure following any type of activity, they should be measured after a period of rest. Contraindications for measuring orthostatic hypotension are shock, severe altered mental status, injuries to spine, pelvis or lower extremities.</p>	
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EVIDENCE

- Orthostatic hypotension is a response to inadequate physiologic response to postural changes. Underlying conditions and reversible causes need to be identified and corrected or treated (Lanier, et. al., 2011)
- Orthostasis when paired with other risk factors can indicate a safety/or a fall risk (CPM resource center, 2013).
 - Conditions associated with orthostasis include hypovolemia, hypertension, advanced age, cardiovascular disease, antihypertensive medications, autonomic nervous system and endocrine disorders. (Lance, et.al., 2000).
 - Patients on prolonged bed rest, the elderly, diabetes or cardiovascular disease are all at an increased risk of orthostatic hypotension (Dingle, 2003).
 - Pharmacological agents can increase risk of orthostatic intolerance; these include loop diuretics, beta blockers, ACE inhibitors, vasodilators, morphine, antipsychotics, and tricyclic antidepressants (Dingle, 2003).

Fall risk assessments, and reviewing patient's risk factors can alert nurses of potential orthostasis (Mager, 2012).

EVIDENCE

- Evidence shows that performing blood pressure checks prior to standing, upon sitting, immediately upon standing and after standing for two minutes provides the most reliable measurement of orthostatic vital signs. (Lance, et. al., 2000)
 - For accuracy of orthostatic vital signs, legs should remain uncrossed and the arm should be support at the level of the heart (Naccarato, 2011).
 - Teach patients to dangle, pump feet and improve cardiac health to decrease the risk of falls related to orthostasis (Mager, 2012).
 - Dangling between the supine and standing period can help minimize reduction in blood pressure (Dingle, 2003).

Shock, severe altered mental status, and injuries to the spine, pelvis or lower extremities are all contraindications for orthostatic vital signs (Naccarato, 2011).

Current Practice at LVHN

- Initial fall risk assessment inquiring if patient has fallen within the past year. Performing the Hendrich II Fall Risk Model and ABCS Injury Risk Assessment on admission, twice daily and with change in patient condition. If a patient reports dizziness or vertigo orthostatic vital signs should be obtained daily, patients should be educated on orthostasis, taught to dangle, perform ankle pumps and stand a full minute before ambulating. They should also be taught to sit down if dizziness occurs. Nursing should review medications, consult the pharmacist and consider physical therapy consult.
- RN's can initiate Physical Therapy and/or Occupational Therapy consults for patients based on admission and on-going assessment findings when a mobility protocol order is placed by a provider.
- 7A-Neuroscience unit at LVH-CC has an orthostatic vital signs monitoring policy in place. Orthostatic vital signs should be obtained upon first time out of bed upon admission or transfer to 7A. A minimum of two-three minutes should be used between position changes.

IMPLEMENTATION

1. Process Indicators and Outcomes

1. Obtaining blood pressure and heart rate laying, sitting and standing, utilizing 3 minute interval between
2. Pre-survey to Registered Nurses and Technical Partners

2. Baseline Data

24% of patients were positive for orthostasis

Staff was not comfortable obtaining orthostatic vital

Staff did not know definition of orthostasis or provider order was not needed

3. Design (EBP) Guideline(s)/Process

Obtaining orthostatic vital signs on initial ambulation of admissions to unit or post-op patients

IMPLEMENTATION

4. Implemented EBP on Pilot Units
TOHU, 4K, RHC-M, 7A
5. Evaluation (Post data) of Process & Outcomes
26% of patients were positive for orthostasis
6. Modifications to the Practice Guideline
See practice change slide
7. Network Implementation
Roll out on more pilot units,
Modification to 7A Orthostatic Vital Sign Policy

Practice Change

- Re-education and reinforcement of the definition of orthostasis and proper technique to obtain orthostatic vital signs.
- Reinforcement of utilizing the Hendrich II Fall Risk Model to obtain orthostatic vital signs on patient positive for dizziness or vertigo.
- Adapt the 7A-Neurosciencine orthostatic vital signs monitoring policy hospital wide.
- Krames patient education regarding orthostatic hypotension.
- For patients with positive orthostasis involve pharmacy in their care to review medications.

RESULTS

■ Key Findings

● Initial-Data

- showed 24% of patients were positive for orthostasis
- 70% of RN's and TP's did not know definition of orthostasis or that a provider order was not needed to obtain
- 48% of RN's and TP's were comfortable obtaining orthostatic vital signs

● Post-Data

- Showed 26% of patients were positive for orthostasis

■ Next steps

- Practice council
- Revision of 7A Orthostatic Vital Sign Policy

Implications for LVHN

- Decreased number of falls
- Patient education on orthostasis
- Collaboration among specialties, nursing, PT/OT, cardiac rehab, pharmacy and physicians

Lessons Learned

- ❑ By taking the couple extra minutes to gather orthostatic vital signs and educate our patients we are a key player in prevention of falls
- ❑ Protecting our patients from harm and educating them helps improve patient satisfaction

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Strategic Dissemination of Results

- PLAN for DISSEMINATION
 - “Roll-out” plan
 - Pilot units
 - Hospital policy change

Make It Happen

- Questions/Comments:

Contact Information:



Cedar Crest

17th Street

Muhlenberg

Health Centers