Orthostatic Hypotension Screening: A Quality Improvement Project

Hazel Rowe, MSN-ED, RN-BC, LGB; Kara McShane, BSN, RN; Alexandra Milnes, APRN; Cassandra Thomas, PharmD; Lisa Wallace, MSN, RNP, NPD-BC, CIC; Karla Robinson, BSN, RN and Junie Hobbie, BSN, RN
After viewing the presentation, you will be able to:

- Recognize Orthostatic Hypotension (OH) as a fall risk
- Identify project implementation and sustainability ideas
- Verbalize knowledge on how to screen for Orthostatic Hypotension
- Identify fall prevention measures that you can incorporate in your practice
Central Arkansas Veterans Healthcare System
Level 1a Facility
Is CAVHS ready to follow Evidence-Based Practice (EBP)?

According to the Organizational Checklist developed by Falls Toolkit Research team, CAVHS is 85% ready for EBP.

Organizational Readiness Checklist

- **Does the organization promote a culture of safety?**
  - Hospital culture focuses on a systems approach to error reduction. **Y**

- **Why is change needed?**
  - Hospital-specific reasons for change have been identified. **Y**

- **Do organizational members understand why change is needed?**
  - Staff attitudes about falls have been assessed. **Y**
  - Assessment results have been analyzed to suggest awareness-building needs. **Y**

- **Is there a sense of urgency about the change?**
  - Supporters who have a sense of urgency have been identified. **Y**
  - Efforts are underway to generate a sense of urgency if lacking. **Y**

- **Is there leadership support for this effort?**
  - Leadership support has been assessed. **Y**
  - If necessary, efforts are underway to generate this support. **Y**
  - Senior leader champion or sponsor has been identified. **Y**

- **Who will take ownership of this effort?**
  - A leader has been identified for the fall prevention effort. **Y**
  - This leader is now involved in the subsequent planning steps. **Y**

- **What kinds of resources are needed?**
  - A preliminary list of needed human and material resources has been developed. **Y**
  - Commitments to provide those resources have been obtained or are forthcoming. **Y**
Is CAVHS ready to follow Evidence-Based Practice?

- **Stakeholders:** Veterans, Veterans’ family members, Registered Nurses, Certified Nursing Assistants, Physicians, Occupational Therapists, Physical Therapists, Nursing Leadership, Executive Leadership, Process Improvement, Risk Management

- **Challenges:** Changing care practices, consistently performing orthostatic hypotension screenings on all admissions, learning how to properly perform orthostatic screening, and implementing fall precautions if orthostasis is present

- **Facilitators:** OH Workgroup, Nursing Leadership, Unit Falls Champions, Falls Reduction RN, Safe Patient Handling Coordinator
Orthostatic hypotension is one of the most common causes of falls. The prevalence is 15% to 50% in adults 60 years of age or older. Mol, A., et al. (2019).

If veterans are screened on admission for orthostatic hypotension, safeguards can be put into place which should prevent falls and fall-related injuries.

Retrieved from: Facts About Falls (cdc.gov)
Step 0: Problem/Clinical Inquiry

- Orthostatic Hypotension (OH) increases the risk for falling.

- Veteran on the dementia unit fell and post fall assessment revealed OH. This prompted a deeper dive into the correlation between falls and OH.

- Chart audits revealed that 35% of the veterans who fell and had OH measurements completed after the fall while in the CLC units from May to July 2019 were positive for OH.
CAVHS FY21 Falls Data

FY21 Fall Rate and Fall with Major Injury Rate

26% increase from FY20 to FY21’s fall rate
Step 1: PICO Question

In the CAVHS inpatient units, how does screening for orthostatic hypotension compared to not screening for orthostatic hypotension affect the fall rate and falls-related major injury rate?
Step 2: Search Strategy

- Boolean Search:
  Orthostatic, hypotension, falls, and accidental falls

- Databases used:
  Medline, CINHAL, and EBSCOhost
The search resulted in 1,495 studies, 56 were reviewed, and 9 studies were deemed relevant to the project.
### Step 3: Evaluation / Summary of Literature

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Study Objectives</th>
<th>Level/Design</th>
<th>Intervention</th>
<th>Results</th>
<th>Limitations</th>
<th>Implications for EBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shields, Quill, Dicenso/2020</td>
<td>Decreased falls on inpatient pilot units by 20%</td>
<td>Quality improvement project, CQI Model, Plan Do Study Act (PDSA)/Data Collection</td>
<td>Two Med Surg units obtained orthostatic vitals on each patient on admission. If positive implement fall precautions.</td>
<td>One unit decreased falls by 29%. One unit decreased 10%.</td>
<td>Not implemented in ICU and surgery units R/T change in electronic documentation.</td>
<td>Immediate and sustained decreased falls on pilot unit. (They used weighted blanket, calendar, and competency.)</td>
</tr>
<tr>
<td>Mol, Hoang, Sharmin, et al/2020</td>
<td>Address the association between orthostatic hypotension and falls in adults age 65+</td>
<td>Systematic Review/Meta-Analysis</td>
<td>Systematic Review 63 studies, Meta-analysis 50 studies</td>
<td>OH, positively associated with falls in older adults independent of population, study design, study quality, OH definition, and blood pressure measurement method</td>
<td>Insufficient studies adjusted for age, sex, and other potential confounders. Most studies were moderate/low quality</td>
<td>Clinically relevant to test for OH to investigate treatment to decrease falls in those 65+.</td>
</tr>
<tr>
<td>Ooi, W. L., Hossain, M., Lipsitz, L.A. (2000)</td>
<td>To determine if falls in elderly were related to hypotension</td>
<td>Level III/ Prospective</td>
<td>844 Nsg home pts &gt;60yr in multiple states. Any subsequent falls over 1.2 years</td>
<td>OH, was an independent risk factor for recurrent falls. The timing of OH didn’t affect the risk of falls.</td>
<td>Too many variables. History of falls places pts at risk. 50% of pts with hx of falls and OH will fall again (95% confidence level)</td>
<td>There are multiple factors that place pts at risk for fall and precautions must be taken.</td>
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<tr>
<td>Testa G; Ceccofiglio A; et al. (2018)</td>
<td>Determine if hypotensive drugs play a pivotal role inducing OH-related syncope</td>
<td>Level III/ quasi-experimental</td>
<td>65+ yrs. with dix of dementia and 1 or more episodes of syncopal event</td>
<td>In elderly dementia pts, OH-related syncopal falls are related to treatment with Nitrates, combinations of ACE-I’s &amp; diuretics, and combos of ACI-I’s and Nitrates</td>
<td>Population study wasn’t randomized.</td>
<td>Certain meds can cause syncope and falls.</td>
</tr>
<tr>
<td>SCHELL, K.; LYONS, D.; BODT, B. (2021)</td>
<td>Determine the prevalence of OH among those hospitalized older adults for whom OVS were measured.</td>
<td>Level IV/ Retrospective study</td>
<td>Unlicensed assistive personnel measure OVS upon patients’ admissions to the ACE units using the Welch Allyn oscillometric blood pressure monitor and OVS procedure in Lippincott Procedures and document in EMR.</td>
<td>According to this study’s results, about 40% of the sample of hospitalized elderly patients experienced orthostatic hypotension, but less than 1% fell during the study period. Neither orthostatic hypotension nor demographic variable explained the falls.</td>
<td>Retrospective chart review prohibited the ability to assess accuracy of the caregivers’ BP measurement procedures.</td>
<td>Consistent measurement of fall risk and strict adherence to OVS procedures will strengthen future studies.</td>
</tr>
<tr>
<td>Gray-Miceli, Deanna; Ratcliffe, Sarah J.; et al. (2020)</td>
<td>To determine salient demographic and patient level factors increasing risk for OH among a sample of elderly.</td>
<td>Level IV/ Retrospective cohort study</td>
<td>This study analyzed existing fall data from a parent study (3-year quality improvement initiative) 12 conducted at a 110-bed Continuing Care Retirement Community with 51 assisted living and 59 skilled nursing beds in the northeastern United States. The sample of 117 falls had completed data for this secondary analysis of OH data.</td>
<td>In this sample of older adult patients, 47 patients experienced a total of 117 falls. The falls resulted in 18 cases of OH. Among those with OH, the mean number of falls was slightly lower at 2.2 compared with 2.8 for those without OH (Table 1). There were no statistical differences between falls with OH and falls without OH, in terms of number of comorbidities or use of cardiac and diabetic medications.</td>
<td>None declared.</td>
<td>Orthostatic hypotension is potentially modifiable once detected. Evidenced-based protocol for assessment and management of OH among patients with gait and balance impairment is presented.</td>
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<td>Brett H. Shaw, Dave Borrell, Kimiya Sabbaghan, Colton Kum, Yi Jian Yang, Stephen N. Robinovitch, Victoria E. Claydon 2019</td>
<td>- Evaluate the relationships between OH, frailty, falling and mortality in elderly care home residents</td>
<td>IV-data study/chart review</td>
<td>- From the Minimum Data Set (MDS) document, a frailty index (FI-MDS) was generated from a list of 58 deficits, ranging from 0 (no deficits) to 1.0 (58 deficits).</td>
<td>- Older adults who are both frail and have impaired orthostatic blood pressure control have a particularly high risk of falling and should receive tailored management to mitigate this risk.</td>
<td>- MDS was not designed for this purpose. The approach has not been fully validated. - Small sample size</td>
<td>- Frailty is related to susceptibility to orthostatic hypotension, falling risk and 3-year mortality</td>
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<tr>
<td>L.C. Hartog, M. Cizmar-Sweelessen, A. Knipscheer, K.H. Groenier, N.Kleefstra, H.J.G. Bilo and K.J.J. van Hateren 2015</td>
<td>- Identify the prevalence of orthostatic hypotension in frail, elderly NH residents - Assess orthostatic hypotension associated with falling and chances of successful rehab</td>
<td>Prospective observational cohort study (290 patients) in Netherlands</td>
<td>- All pts from NH a) psychogeriatric dept (106 pts with severe to very severe dementia) b) somatic dept (56 pts) c) rehab dept (128 pts) - All pts had questionnaires &amp; BP measurements (2x in supine position and 2x in postural change) - Rehab pts were assessed for successful discharge</td>
<td>- Average age 80.9 - OH present in 106/290; prevalence of 36.6% - For rehab pts no significant relation found between orthostatic hypotension (OH), orthostatic complaints, or symptomatic OH - Association between orthostatic hypotension and previous falling was not significant - Pts with OH higher chance of successful rehab</td>
<td>- Observational &amp; establishing a causal relation is not possible - Selection bias: many pts in a NH on a rehab unit were admitted due to fall or fracture which creates bias with respect to falls and OH</td>
<td>Orthostatic hypotension is highly prevalent in nursing home residents</td>
</tr>
<tr>
<td>Mathew S. Maurer MD, Samantha Cohen MD, Huai Cheng MD, MPH, MS 2004</td>
<td>- Define timing and degree of orthostatic changes in BP in elderly NH residents - If orthostatic changes in blood pressure with noninvasive beat-to-beat technology would predict falls better than standard def of OH</td>
<td>Prospective, time-to-event analysis</td>
<td>- All residents of same NH - Measured orthostatic BP changes during active standing for up to 3 min using a real-time, beat-to-beat, continuous device (CBM-7000) placed on non-dominant wrist &amp; arm then arm placed in a sling to stabilize</td>
<td>- Mostly women - Average age 88 - 41% (46 pts) fell - Standard definition of OH was not predictive of subsequent falls (hazard ratio 1.03 at 1 minute and 1.32 at 3 minutes, P = not significant)</td>
<td>- Small sample size (111 pts) - Pt’s arm had to be stabilized at the same height relative to the heart during measurement and high use of assist devices (walkers and canes) - Measurements only taken in the morning (8am-noon)</td>
<td>- Neither standard nor beat-to-beat tonometry were independent predictors of falls in frail NH residents - The timing and degree of orthostatic changes in BP does not significantly enhance risk prediction of falls</td>
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</tbody>
</table>

**EBP Question:** In the CAVHS inpatient units, how does screening for orthostatic hypotension compared to not screening for orthostatic hypotension affect the fall rate and falls-related major injury rate?

<table>
<thead>
<tr>
<th>Category (Level Type)</th>
<th>Total Number of Sources/Level</th>
<th>Overall Quality Rating</th>
<th>Synthesis of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level I</strong></td>
<td></td>
<td></td>
<td>Evidence Synthesis</td>
</tr>
<tr>
<td>▪ Experimental study</td>
<td>1</td>
<td>High Quality</td>
<td>Orthostatic hypotension is significantly positively associated with falls in older adults, underpinning the clinical relevance to test for an orthostatic blood pressure drop and highlighting the need to investigate orthostatic hypotension treatment to potentially reduce falls.</td>
</tr>
<tr>
<td>▪ Randomized controlled trial (RCT)</td>
<td></td>
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<tr>
<td>▪ Systematic review of RCTs with or without meta-analysis</td>
<td></td>
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<tr>
<td>▪ Explanatory mixed method design that includes only a Level I quantitative study</td>
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<tr>
<td><strong>Level II</strong></td>
<td>1</td>
<td>Good Quality</td>
<td>The standard definition of OH was not an independent predictor of falls in frail nursing home residents. A one-time measure for the presence of postural hypotension using best-to-best tonometry was not predictive of fall risk. The timing and degree of orthostatic changes in blood pressure does not significantly enhance risk prediction for falls.</td>
</tr>
<tr>
<td>▪ Quasi-experimental studies</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>▪ Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis</td>
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<td></td>
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<tr>
<td>▪ Explanatory mixed method design that includes only a Level II quantitative study</td>
<td></td>
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<tr>
<td><strong>Level III</strong></td>
<td>5</td>
<td>High Quality</td>
<td>Study 1) Orthostatic hypotension is an independent risk factor for recurrent falls among elderly nursing home residents. Although the benefit of treating orthostatic hypotension will require further study, it may be prudent to identify high-risk residents and institute precautionary measures.</td>
</tr>
<tr>
<td>▪ Nonexperimental study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies only, with or without meta-analysis</td>
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<td></td>
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<tr>
<td>▪ Qualitative study or meta-synthesis</td>
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<tr>
<td>▪ Explanatory, convergent, or multiphasic mixed-methods studies</td>
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<tr>
<td>▪ Explanatory mixed method design that includes only a Level III quantitative study</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level IV</strong></td>
<td>3</td>
<td>Low Quality</td>
<td>Study 2) OH is highly prevalent in nursing home residents. Surprisingly, patients with OH were found to have a higher chance of successful rehabilitation compared to patients without OH. If confirmed in other studies, these results may change our view of the implications of OH.</td>
</tr>
<tr>
<td>▪ Opinions of respected authorities and/or reports of nationally recognized expert committees or consensus panels based on scientific evidence</td>
<td></td>
<td></td>
<td>Study 3) In older adults with dementia, OH-related syncope falls are significantly related to treatment with nitrates, combinations of ACEIs and diuretics, and combinations of ACEIs and nitrates.</td>
</tr>
<tr>
<td><strong>Level V</strong></td>
<td>1</td>
<td>High Quality</td>
<td>Study 1) Frailty can be captured using a frailty index based on MDS data in elderly individuals living in long term care, and is related to susceptibility to orthostatic hypotension, falling risk, and 5-year mortality. Use of the MDS to generate a frailty index may represent a simple and convenient risk assessment tool for older adults living in long term care. Older adults who are both frail and have impaired orthostatic blood pressure control have a particularly high risk of falling and should receive tailored management to mitigate this risk.</td>
</tr>
<tr>
<td>▪ Evidence obtained from literature or integrative reviews, quality improvement, program evaluation, financial evaluation, or case reports</td>
<td></td>
<td></td>
<td>Study 2) OH is possibly modifiable once detected. Evidence-based protocols for assessment and management of OH among patients with balance and gait impairments is explored.</td>
</tr>
<tr>
<td>▪ Opinion of nationally recognized expert(s) based on experiential evidence</td>
<td></td>
<td></td>
<td>Study 3) In two acute care units, the odds of falls in the presence of OH was 1.84 with a 95% confidence interval. However, a chi-square test failed to show significance. Results couldn’t determine if OH screening should be mandatory in fall prevention protocols.</td>
</tr>
<tr>
<td>▪ Other</td>
<td></td>
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</table>
Summary of Literature

- Orthostatic hypotension is a risk factor for falls.

- Screening for OH upon admission, is an additional way to pro-actively prevent falls.

- There should be a standardized process for assessing orthostatic vital signs.
Step 4: Evidence-Based Recommendations

- Conduct orthostatic hypotension (OH) screening during admission in inpatient areas

- If positive for OH
  > educate the Veteran
  > initiate fall prevention order
  > notify the provider & pharmacist
  > initiate fall prevention interventions
Step 4: Evidence Based Recommendation

OH Screening Project for Inpatient Units
Step 4: Implementation Plan

- Review current practice and the proposed change in practice with leadership, nursing management, CNSDs, providers, and fall champions from all inpatient areas.

- Create an Orthostatic Hypotension screening tool to be used during the admission process.
Step 4: Evidence Based Recommendation

Orthostatic Hypotension Screening Template

**Orthostatic Screening Questions**

1. Is the Veteran ≥ 65 years of age? Yes or No
2. Does the Veteran have history of cardiovascular disease, liver disease, or alcohol abuse? Yes or No
3. Does the Veteran get dizzy when changing positions? Yes or No or Unable to Answer

**If the Veteran answered “NO” or only answered one “YES,” the screening is complete.**

**If the Veteran is unconscious or unable to answer question #8, the screening is complete. Screen again when the Veteran can respond.**

**If the Veteran answered “YES” to two out of three questions, proceed to question 4.**

4. Does the Veteran have:
   a. Supine hypotension
   b. Sitting blood pressure ≤90/60
   c. Acute deep vein thrombosis
   d. Exhibit the clinical syndrome of shock
   e. Severe altered mental status
   f. Possible spinal injuries
   g. Lower extremity or pelvic fractures
   h. Not mobile enough to get out of bed

**If the Veteran answered “YES” to any condition, the screening is complete.**

**If the Veteran answered “NO” take orthostatic VS.**

<table>
<thead>
<tr>
<th>Position</th>
<th>Time</th>
<th>BP</th>
<th>Associated Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying Down</td>
<td>5 minutes</td>
<td>BP___/___</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR___/___</td>
<td></td>
</tr>
<tr>
<td>Standing</td>
<td>1 minute</td>
<td>BP___/___</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR___/___</td>
<td></td>
</tr>
<tr>
<td>Standing</td>
<td>3 minutes</td>
<td>BP___/___</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HR___/___</td>
<td></td>
</tr>
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</table>

**If the patient is unable to stand, orthostatic may be taken while the patient is sitting with feetstngng.**

**A drop in systolic BP of ≥20 mm Hg or in diastolic BP of ≥10 mm Hg, or experiencing lightheadedness or dizziness indicates positive orthostatic hypotension.**

5. Is the Veteran positive for orthostatic hypotension? Yes or No

**If “NO” no further action is needed.**

If “YES”

a. Provide orthostatic hypotension education
b. If at high risk for falls (Morse Score of ≥4) initiate the fall prevention order and interventions
c. Add the provider as additional signer if there is a significant drop in BP (≥20mm Hg systolic or ≥10 mm Hg in diastolic blood pressure) and
   a. heart rate increase of at least 30 beats per minute after 3 minutes of standing (may suggest hypovolemia) or
   b. symptoms (dizziness, lightheaded, palor, diaphoresis, or faintness) do not resolve when resuming a supine position.
Step 4: Implementation Plan

- Update the Fall Prevention Order set to be used if a veteran has a Morse ≥45 or is positive for orthostasis.

- Set staggered implementation dates beginning with the Community Living Center, then Mental Health Services, and last Acute Care Services.

- Provide education to inpatient staff a month prior to implementation.
Step 4: Implementation Plan

Nursing staff education – How to take orthostatic VS

Patient Education Brochure
Step 4: Implementation Plan

Project Timeline

2Q FY21
- Plan
- Create a team
- Literature review
- Protocol

3Q FY21
- VC3 approval
- MEB approval
- Protocol revision

4Q FY21
- Prep materials
- Educate CLC staff
- Pilot – CLC

1Q FY22
- Educate MHU staff
- Rollout-MHU
- Educate ACU/CCU staff
- Rollout-ACU/CCU

2Q FY22
- Achieved 78% compliance
- Continue Audits

Central Arkansas Veterans Healthcare System
Step 5: Outcome Evaluation

- Audit charts for OH assessments on all admissions to the Community Living Center and Mental Health Services.

- Audit five new admissions charts per month from each Acute Care Services area.

- Monitor and evaluate fall and falls with major injuries rates to compare with previous year prior to implementation.
Step 5: Outcome Evaluation

34% decrease in fall rate from August 2021 to May 2022

69% decrease in major injury rate from August 2021 to May 2022
Step 5: Outcome Evaluation

Major injury rate decreased by 50%
(FY21) 0.04 to (FY22) 0.02

Fall rate decreased by 35%
(FY21) 4.98 to (FY22) 3.24

*Current as of 6/29/22
Sustainability Plan

- Continuous education for current and new staff (New Employee Orientation, unit-specific orientation, and just-in-time education).

- Share compliance data with leadership, management, CNSDs, staff, and Falls Workgroups.
Dissemination Plan

- Safety Skills Fair for CAVHS staff
- Share with other VA facilities through call conferences
- ONS Virtual EBP Poster session
- Share findings with external stakeholders after IRB approval
ANY QUESTIONS?


