Development of a Tool to Assess Risk for Falls in Women in Hospital Obstetric Units

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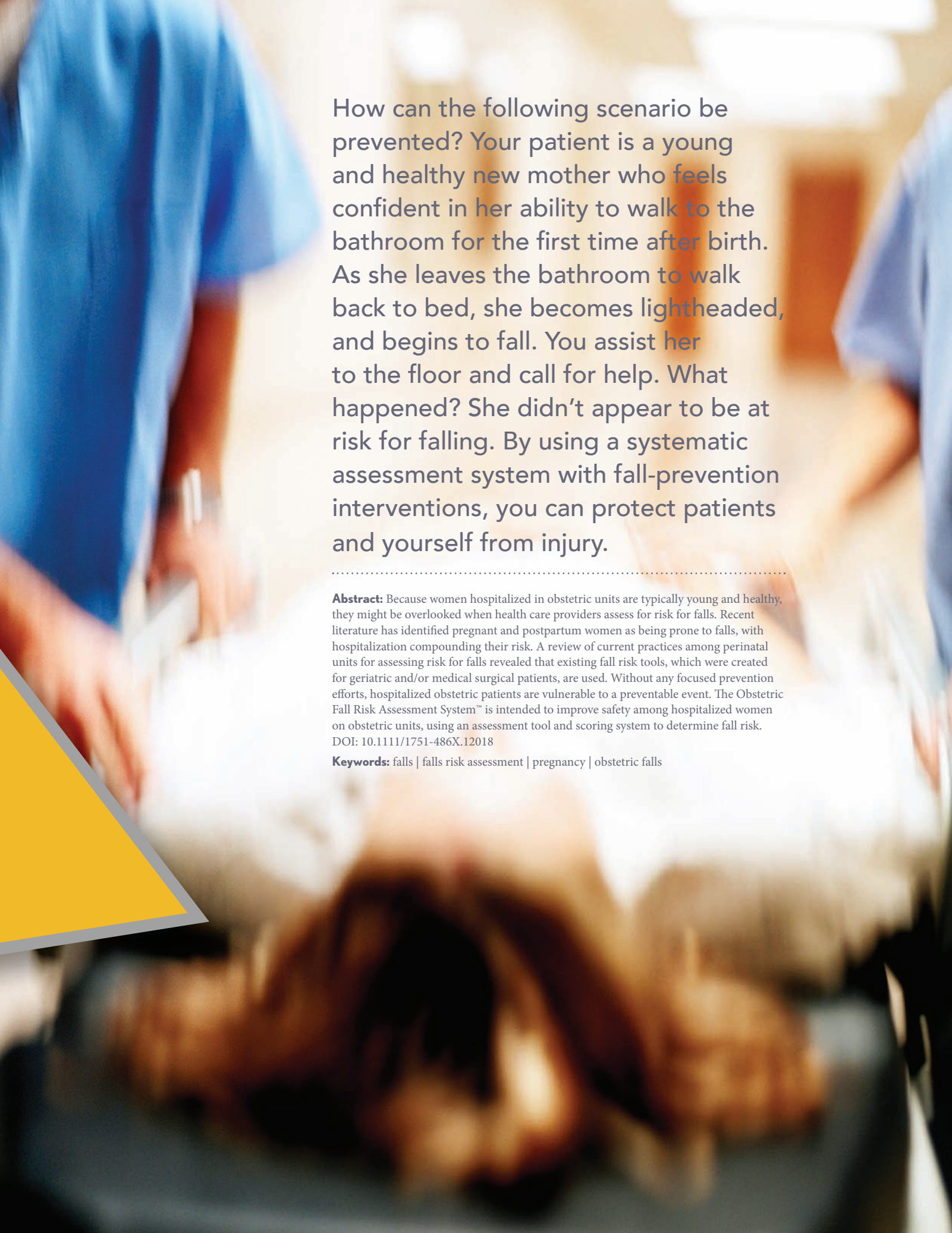

How can the following scenario be prevented? Your patient is a young and healthy new mother who feels confident in her ability to walk to the bathroom for the first time after birth. As she leaves the bathroom to walk back to bed, she becomes lightheaded, and begins to fall. You assist her to the floor and call for help. What happened? She didn't appear to be at risk for falling. By using a systematic assessment system with fall-prevention interventions, you can protect patients and yourself from injury.

Abstract: Because women hospitalized in obstetric units are typically young and healthy, they might be overlooked when health care providers assess for risk for falls. Recent literature has identified pregnant and postpartum women as being prone to falls, with hospitalization compounding their risk. A review of current practices among perinatal units for assessing risk for falls revealed that existing fall risk tools, which were created for geriatric and/or medical surgical patients, are used. Without any focused prevention efforts, hospitalized obstetric patients are vulnerable to a preventable event. The Obstetric Fall Risk Assessment System™ is intended to improve safety among hospitalized women on obstetric units, using an assessment tool and scoring system to determine fall risk.
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Scope of the Problem

Pregnant women aren't typically regarded as high risk for falls; however, falls are the second leading cause for emergency department visits for this population (Weiss, Sauber-Schatz, & Cook, 2007). More than half of reported injuries during pregnancy are due to falls occurring during activities of daily living (Tinker, Reefhuis, Dellinger, Jamieson, & the National Birth Defects Prevention Study, 2010). Falls may also result in adverse consequences that affect both a woman and her fetus. In one study, infants born to injured pregnant women were more likely to be born prematurely or to have a low birth weight (Weiss et al., 2007). Dunning, LeMasters, and Bhattacharya (2010) reported a fall rate of 27 percent for pregnant women, which is comparable to a fall rate of 25 percent for a person 70 years of age.

For adults ages 65 and older, the Centers for Disease Control and Prevention (CDC) reported that one of three older adults fall yearly and injury statistics indicate that falls are the leading cause of death resulting from an injury (CDC, 2012). These statistics validate a focus of falls research on the geriatric population. A national benchmark for inpatient obstetric fall rate has yet to be determined. Yet, despite the critical nature of falls in obstetric patients, there is a paucity of research identifying fall risk factors and their prevention.

Implementing a population-specific fall-prevention program is a safety goal at our institution. The institutional fall risk tool that we applied to identify women at risk for falls rated most of our patients as low risk. Contrary to the score of the tool, the number of falls in our obstetric unit had increased. The purpose of this article is to describe how a quality improvement project evolved into the development and implementation of the standardized evidence-based Obstetric Fall Risk Assessment System™ (OFRAS™) to improve safety for women hospitalized in obstetric units.

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Search for Evidence

To address this clinical problem, we conducted a literature review for research and other evidence-based information related to risk factors associated with falls in obstetric patients. We used various data sources, such as PubMed and CINAHL, and applied selected search terms such as *falls*, *pregnancy* and *obstetric injury*. A team of nurses on the unit partnered with the nurse manager, director of research and evidenced-based practice and a nurse researcher from the school of nursing to spearhead an improvement project to develop an evidence-based guideline and tool to assess factors that increase risk for falls among women hospitalized in obstetric units.

Fall prevention became a national patient safety goal of The Joint Commission (TJC) in 2005 and is now considered a standard of practice in most institutions (TJC, 2012). In 2002, the National Quality Forum (NQF) identified injury from a fall as a "never event," meaning that death or serious injury from a fall should not occur during hospitalization and that health care professionals should develop strategies to decrease the incidence of falls (NQF, 2011). In 2008, the Centers for Medicare and Medicaid Services (CMS) listed falls as one of eight hospital-acquired conditions that would no longer be

reimbursed (Inouye, Brown, & Tinetti, 2009). These new regulations from TJC, NQF and CMS built the momentum for health care institutions to begin evaluating the efficacy of fall risk assessment tools.

In the absence of research on fall-prevention tools for women hospitalized in obstetric units, we queried the University Hospital Consortium listserve (listserv@aura.uhc.edu) and Perinatal Advisory Council of Los Angeles County (PAC/LAC) regarding the type of fall risk assessment tools used in other perinatal units. Replies from the query indicated that existing fall risk tools such as Morse Fall Score (MFS), Hendrich (I) Fall Risk Model and Schmid were being used on these perinatal units. Therefore, we chose to review these three risk fall tools to determine their applicability to the obstetric population.

The MFS is the most widely used fall instrument because it is well-researched and has undergone compelling reliability testing in adult medical-surgical patient populations and long-term rehabilitation care areas (Morse, Black, Oberle, & Donahue, 1989). However, the authors (Morse et al., 1989) identified the exclusion of obstetric and pediatric populations as a limitation of the MFS. The Hendrich (I) Fall Risk Model was developed from a review of patients in an acute setting and has been tested only among oncology and orthopedic patients (Hendrich, 1988). The Schmid tool was developed by comparing a group of "fallers" with age-matched "nonfallers" and tested on patients from four nursing units deemed to be high risk for falls (Schmid, 1990). Although these fall risk tools are used clinically, none was developed or tested with the obstetric population. Because evidence supports that the application of fall risk instruments to populations other than the original study population is unreliable (Chapman, Bachand, & Hyrkas, 2011; Myers, 2003; Vassallo, Srockdale, Sharma, Briggs, & Allen, 2005), these three instruments may not be appropriate tools to identify women in obstetric units at risk for falls.

The Postepidural Fall Risk Assessment Score (PEFRAS) is the only published work about obstetric fall prevention. We developed this tool based on the MFS and the modified Aldrete scoring system (Aldrete, 1998), which is used to determine recovery from anesthesia in postoperative patients (Frank, Lane, & Hokason, 2008). Although this tool was developed for obstetric patients, it's limited to women who received epidural anesthesia and has not been tested for reliability or validity.

There is need for a valid and reliable fall assessment tool for obstetrics. This became increasingly evident when we retrospectively applied the MFS—the fall assessment tool used in our institution—to six obstetric patients who fell in 2009 and 2010. Only one of those who fell was identified as high risk for falling. This led us to further review the literature in order to develop a standardized evidence-based system for fall risk assessment in hospitalized obstetric patients beyond those who had received an epidural. We developed the OFRAS™ to include all phases of obstetric hospitalization (antepartum, intrapartum and postpartum) as a woman's condition changes.

Pregnant women aren't typically regarded as high risk for falls; however, falls are the second leading cause for emergency department visits for this population

Development of the OFRAS™ Tool

The OFRAS™ tool was created to standardize and improve accuracy of fall risk assessments on the obstetrics unit and was designed with the intention to assess all the potential fall risk factors that a woman might encounter throughout her stay. We developed the tool after an expert panel identified obstetric fall risk factors and we then validated these factors with a literature review. The guideline provided nurses with a framework for fall risk assessment by focusing on a nurses' assessment of women's readiness to ambulate, since 37 percent of inpatient falls occur during ambulation for toileting needs (Hitcho et al., 2004). Staff training for the new guideline was achieved through lecture and discussion. Falls decreased from five to one in an 8-month period following implementation of the new guideline (Figure 1). The guideline increased staff's knowledge for fall risk factors but did not differentiate between high- and low-risk levels. Furthermore, the guideline relied on individual nursing judgment to assess women's fall risk status and research suggests that inexperienced nurses are less accurate in identifying women at risk for falls (Myers & Nikoletti, 2003).

Before constructing the fall risk assessment tool, it was essential to define what constitutes a fall. Our hospital-wide definition for a fall is "an unplanned descent to the floor or other hard surface." This definition leaves room for interpretation; for example, is it a fall if a woman's descent to the floor is assisted by staff? Morse's best advice on this dilemma was "to use your best judgement" (Morse, 2009). We applied a classification of

"near miss" for an event when a woman is assisted from bed, becomes symptomatic and is safely returned to bed or a chair. Thereafter, staff education included reporting of all falls and near misses for review.

To construct the OFRAS™ scoring tool, obstetric fall risk factors were stratified across six categories of risk by grouping common factors together. A case study approach was used to educate nursing staff about the new OFRAS™ scoring tool. The case studies were initially presented at a quarterly Perinatal Preceptor Workshop, a meeting of our most experienced perinatal nurses. The feedback from the case study review resulted in refinements of the tool by clarifying ambiguities and definitions within the categories. Fall risk factors were weighted within each category and assigned a score of 0, 1, 2 or 3, with a higher number reflecting greater fall risk. To determine a risk score, the nurse selected all applicable risk factors based on patient assessment for each category. Only the highest rated factor from each category was used to calculate the final fall risk score. Any other way of documenting the risk score in our electronic record would have necessitated a change to another screen adding burden and possibly a low compliance. A total obstetric fall risk score (0 to 18) was calculated by adding the highest assessed risk score from each of the six categories.

The OFRAS™ tool was evaluated by applying it retrospectively to 6 inpatient obstetric falls and 14 near misses. The score range for women who fell was higher (OFRAS™ score range 2 to 14) than in the near-miss patients (OFRAS™ score range 1 to 9). Therefore, scores were stratified as follows: 0 to 2 (low risk), 3 to 4 (moderate risk) and greater than 5 (high risk).

Categories of Risk

Prior History

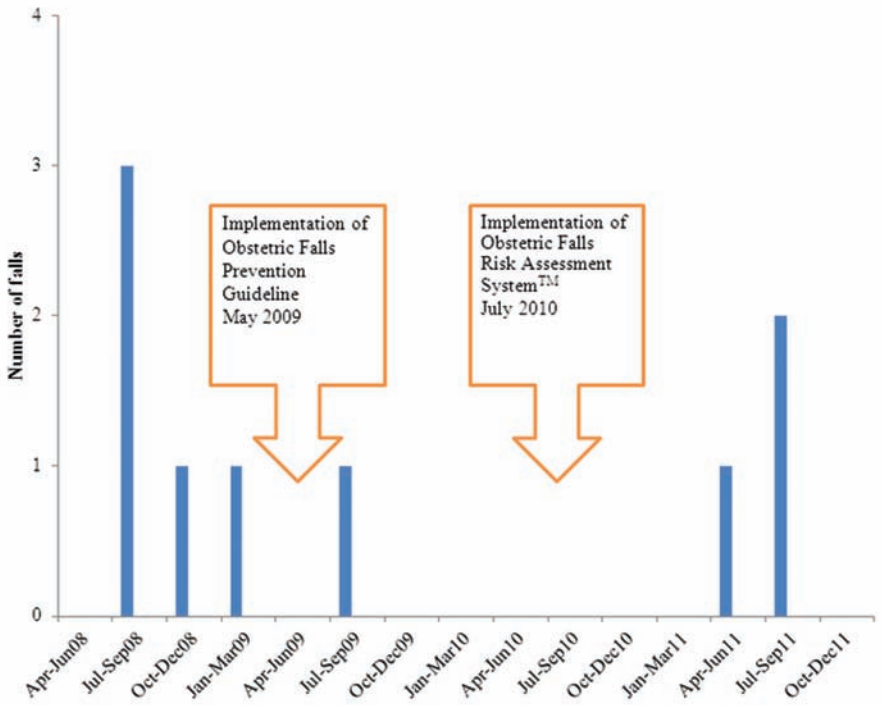
The prior history category addresses fall risk factors present prior to admission to the hospital. These include prior history of falls, bed rest and visual impairment. These prior history risk factors are commonly assessed in other fall risk tools and are also applicable to women hospitalized on obstetric units.

History of falls is a significant risk factor and can be found as part of the assessment in many fall risk tools (Evans, Hodgkinson, Lambert, & Wood, 2001; Hitcho et al., 2004; Morse et al., 1989; Poe, Cvach, Gartrell, Radzik, & Joy, 2004). The repeat fall rate in pregnancy is reported as 35 percent (Dunning et al., 2010), which is high when compared with 16 percent to 52 percent reported of all patients who fall in the hospital setting (Evans et al., 2001). Using the OFRAS™ tool, an obstetric patient who fell within the last 3 months would receive a score of 2 on this measure (Figure 2).

History of bed rest is included as an indicator because it's a common practice for women with preterm labor; in fact, bed rest is prescribed for nearly 1 million women a year for pregnancy complications. The deconditioning effects of bed rest to the musculoskeletal system include muscular atrophy and changes in bone tissue that over time can lead to osteoporosis (Sprague, 2004). These effects can begin within days of beginning the bed rest.

Maloni (2010) found that bed rest in pregnant women causes deconditioning comparable to that seen in subjects who participate in aerospace studies, and complete recovery was not achieved even at 6 weeks postpartum. Using the OFRAS™ tool, an obstetric patient with history of prescribed bed rest in the last 2 months would receive a score of 2 on this measure (Figure 2).

FIGURE 1
Number of Physiologic Falls Recorded Before and After Implementation of the Obstetric Falls Prevention Guideline and the Obstetric Fall Risk Assessment System™



There is need for a valid and reliable fall assessment tool for obstetrics

History of visual impairment is included as an indicator because research supports that for up to 8 weeks postpartum, pregnant women rely heavily on visual cues for stability when walking. (Butler, Colon, Druzin, & Rose, 2006). Visual impairment is scored based on the degree of severity at the time of assessment. Using the OFRAS™ tool, an obstetric patient requiring corrective lenses but not wearing them would receive a score of 1 on this measure; a woman with visual impairment beyond corrective lenses would receive a score of 3 (Figure 2).

The prior history category also addresses relevant pre-existing risks factors for women on the obstetric unit that may affect her stability when attempting to walk in the hospital setting. These factors include history of dizziness, lightheadedness, diabetes, musculoskeletal disorders, central nervous system disorders and use of a walking aid or wheelchair.

Cardiovascular

The cardiovascular category considers cardiac- and vascular-related factors affecting women's stability when attempting to ambulate. To support the growing fetus, pregnancy causes an increase in cardiac output, decrease in vascular resistance and vasodilation (Fujitani & Baldesseri, 2005). When a non-pregnant adult stands, 300 to 800 mL of blood can surge to the lower extremities, requiring a complex cardiovascular response to maintain blood pressure and perfusion to vital organs (Bradley & Davis, 2003). Therefore, when a pregnant woman stands, these cardiovascular changes may predispose her to inadequate compensatory mechanisms to maintain orthostasis.

Orthostatic hypotension results when the body does not respond adequately to postural changes. The definition for positive orthostatic vital signs in the OFRAS™ instrument is a 20 percent change in heart rate, systolic and diastolic blood pressure (Aldrete, 1998). In OFRAS™, a positive orthostatic measurement would result in a score of 3 (Figure 2).

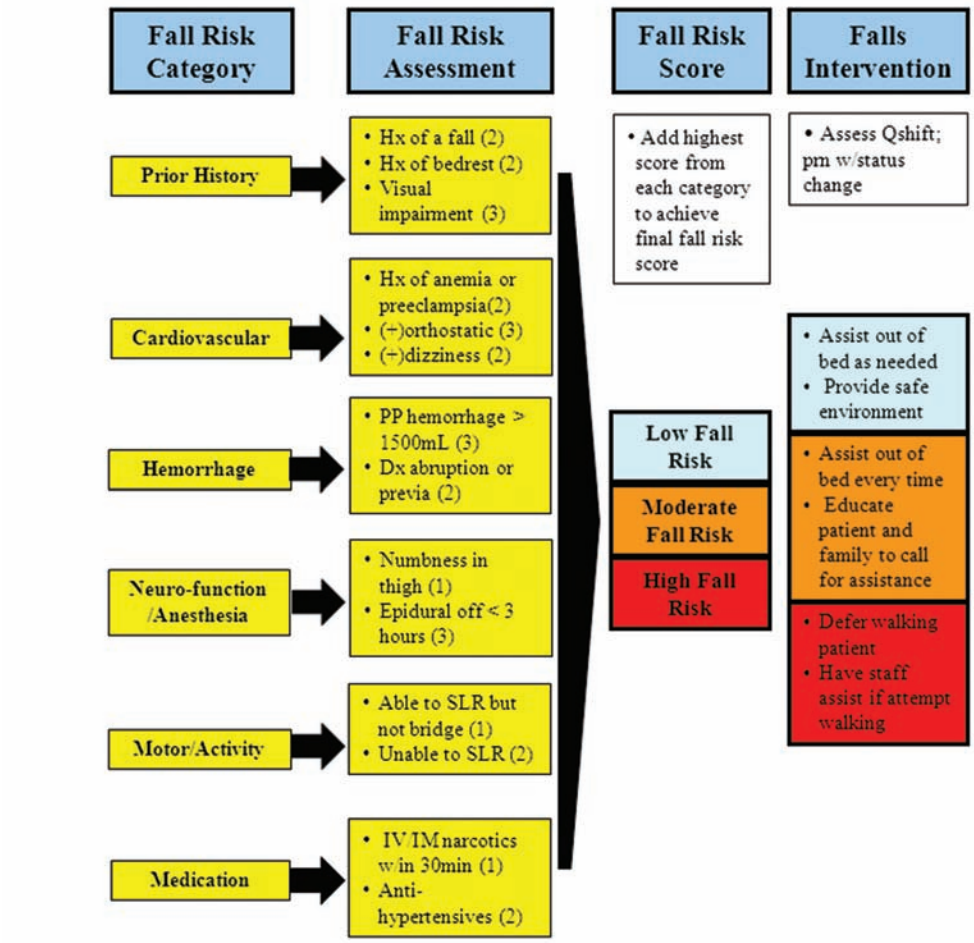
This category also considers other disorders such as anemia, thrombocytopenia and pre-eclampsia, which can affect cardiovascular status and elevate risk for fall. These disorders are given an OFRAS™ score of 2. Women experiencing fall risk symptoms such as lightheadedness, dizziness, blurred vision and weakness are given a higher OFRAS™ score of 3 (Figure 2).

Hemorrhage

This category considers obstetric hemorrhage and its effect on risk for fall. Postpartum hemorrhage is defined as blood loss greater than 500 mL with vaginal birth and 1,000 mL with cesarean birth. The California Maternity Quality Care Collabora-

FIGURE 2

Systematic Flow of the OFRAS™ From Assessment to Assigning Risk Levels That Correlate With Preventive Interventions



Note: This is a sample of risk factors assessed for each category; the corresponding OFRAS™ risk number is in parentheses.

tive (CMQCC) reported an increase of 27.5 percent in the rate of postpartum hemorrhage in the United States from 1994 to 2004 (Bingham, Lyndon, Lagrew, & Main, 2011). The CMQCC Obstetric Hemorrhage task force subsequently created a guideline that identified three stages of postpartum hemorrhage. This classification was incorporated directly into the OFRAS™ tool. Greater blood loss correlates to a higher OFRAS™ score in the hemorrhage category. For example, postpartum hemorrhage for vaginal birth of 1,500 mL results in the highest OFRAS™ score of 3 for this measure (Figure 2).

For antepartum patients, bleeding is usually associated with placental abruption or placenta previa. Both these conditions place women at risk for greater blood loss leading to anemia, hypotension and instability to postural changes when attempting to ambulate. An antepartum woman presenting with bleeding or a diagnosis of a placental abruption or placenta previa with the current pregnancy would receive an OFRAS™ score of 2 (Figure 2).

Neurologic Function and Anesthesia

The neurologic function and anesthesia category evaluates potential sensory deficits, level of consciousness (LOC) as well as duration of the recovery period from time of birth and discontinuation of anesthesia. General anesthesia, regional anesthesia and pushing posture during second stage can all cause sensory deficits in the lower extremities. Sensory deficit is assessed by asking a woman whether—and where—residual numbness or tingling remains. The LOC is evaluated by standard assessment techniques (e.g., awake, sleepy but arousable or lethargic). The duration of recovery period was based on the retrospective review of obstetric patient falls, which revealed a 3-hour vulnerable time period in which falls occurred. We

Medications that affect blood pressure may cause hypotension, lightheadedness or dizziness. Other medications may cause sedation, diminished mental alertness and/or muscle relaxation

increased surveillance and patient risk score assessment during this time, defining the recovery start time as the time of birth or discontinuation of anesthesia, whichever occurs later. A woman who has numbness in her right thigh would receive an OFRAS™ score of 1. However, if her epidural discontinuation is less than 3 hours, she would receive the higher OFRAS™ score of 3 (Figure 2).

Motor/Activity

Both sensory and motor assessments are crucial to determine a woman's readiness to ambulate. The prior neurologic function and anesthesia category assessed the sensory component. The motor and activity category addresses the patient's lower extremity motor capability and her activity level. Return of motor function is assessed by a straight leg raise against gravity and by the ability to bridge. The bridging maneuver requires the woman to lift her hips from the bed in a supine position with knees bent at 90°. This maneuver helps assess the trunk, hip and thigh muscles (Ekstrom, Donatelli, & Carp, 2007). Activity level is determined by standard descriptors (e.g., bed rest, bathroom privileges or ad lib activity). A woman who is able to straight leg raise but unable to bridge receives an OFRAS™ score of 1, whereas a woman who is unable to straight leg raise receives a score of 2 (Figure 2).

Medication

The medication category addresses effects from prescribed medications for the hospitalized woman. The tool identifies medications most commonly used during pregnancy. Nurses also assess individual women for other medications not commonly used in pregnancy that may affect fall risk. Medications that affect blood pressure may cause hypotension, lightheadedness or dizziness. Other medications may cause sedation, diminished mental alertness and/or muscle relaxation. These resulting physical symptoms may affect the risk of fall during ambulation. A woman receiving narcotics is assigned an OFRAS™ score of 1 while a woman on antihypertensives would receive an OFRAS™ score of 2 (Figure 2). A combination of both medications would result in an OFRAS™ score of 3.

Linking OFRAS™ Scores With Clinical Interventions

The OFRAS™ includes a scoring tool to quantify fall risk for obstetric inpatients with recommended fall-prevention interventions that reflect their fall risk scores. Recent literature indicates that using evidence-based interventions makes the tool more beneficial (Harrington, Luquire, Vish, & Winter, 2010). By using fall risk designations of low, moderate or high, the OFRAS™ tool provides staff with specific interventions as patients begin to walk. For example, a woman with a high fall risk score should delay ambulation and consider using a bedpan. Women with moderate risk could attempt ambulation with added interventions such as being provided with a wheelchair, extra personnel or an ammonia ampule. Women identified as moderate- or

FIGURE 3
"Yellow Falling Star" Placard

high-risk for a fall receive a yellow fall risk band and a yellow "falling star" placard outside their room (see Figure 3), which are hospital-wide designations for fall risk patients. In this way, the OFRAS™ integrates with the hospital fall risk management plan by directing appropriate interventions linked to women's fall risk scores (Figure 2).

Outcomes of OFRAS™

The culture of the obstetric unit has changed with increased staff awareness and vigilance regarding fall risk. This has resulted in greater compliance to the guideline of care for fall prevention, staff communicating fall risk levels in hand-off report, and reporting of near-miss falls. Information from near-miss fall events can be vital in the modification and improvement of fall-prevention plans (Morse, 2009) and has been used to evaluate and improve the OFRAS™. After the immediate posteducation period, there was only one fall; no falls occurred in the following 21 months (Figure 1). Subsequently, only three falls occurred in the following three quarters. All these falls involved motor and sensory deficits of the lower extremities, indicating the need for continued vigilance in assessing a woman's readiness to ambulate. This small number of fall events may be related to normal variability of the phenomena under study. Furthermore, without any national report of obstetric falls rates, benchmark data are unavailable and this prevents us from drawing conclusions regarding the efficacy of the OFRAS™.

Conclusion

Women hospitalized in obstetric units who are at risk for falls can be evaluated using an evidence-based framework that helps nurses assess and identify those at risk and provide appropriate interventions. In our medical center, implementation of a standardized evidence-based nursing fall assessment tool improved care in several ways. The nurses' assessments have become more thorough and the tool has been successful in identifying risk factors that may lead to women falling. Nurses at the point of care delivery played a key role in developing and successfully implementing a standardized fall risk assessment system for the women on our obstetric unit. The initial implementation of the OFRAS™ has improved patient safety by

decreasing the number of falls and increasing staff awareness of obstetric fall risk factors.

Further research is needed to determine if the OFRAS™ can predict falls for hospitalized pregnant women. Expansion of the OFRAS™ to multiple hospitals would provide a larger sample of pregnant patients who fell to evaluate the reliability, validity and predictive ability of the tool. Having a valid and reliable tool is important so that other institutions can benefit from this work and promote a safer environment for women who are at risk for fall. The inquiry and interest in the OFRAS™ from other perinatal facilities have validated its necessity and importance. **NWH**

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