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Relative Performance of Bedside Mobility Assessment Tool 2.0 (BMAT) Over Others for Acute Care Patient Recovery

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Abstract

Immobility compromises almost all of the body's systems. Research indicates that individuals who were mobile before being admitted to the hospital may spend approximately 83% of their hospital stay in bed, and over one-third of hospitalized patients over the age of 70 are released from the hospital with a significantly higher physical limitations than prior to hospital admission. Healthcare professionals should be able to accurately assess patient's mobility status in order to implement interventions to mobilize patients even in the presence of deficiencies. The purpose of this review is to assess the Bedside Mobility Assessment Tool 2.0 (BMAT 2.0), to objectively identify patient mobility function deficiencies and assist the healthcare team in choosing the right equipment for patients to be handled and moved safely. BMAT 2.0 is best used by the interdisciplinary team, involved in patient care, and can be recorded in the electronic health record (EHR). Further, a comparative account of other methods being practiced vis-à-vis the BMAT is given in this article.

Keywords: BMAT 2.0, Acute care, Bedside Mobility assessment tool (BMAT), Banner Bedside mobility assessment tool, Length of stay, Safe patient handling and Mobility (SPHM)

Introduction

Extended bed rest for those who are hospitalized may result in loss of muscle strength, soft tissue changes, psychological issues, long term pressure-ulcers, skin deterioration, and nosocomial pneumonia, among other unexpected consequences (5). During immobilization, muscle strength decreases at a rate of 20% per week (1). Furthermore, pressure ulcers, falls, and functional decline are among the additional hospital hazards that are predicted by low mobility (1). Nurses play a vital role in patient care at hospitals and must have a thorough understanding of the patient's health. Although it is widely known that assessing a patient's mobility early on is crucial for preventing falls, nurses often struggle to do so at the patient's bedside (1). The amount of effort, patience, and expertise the physician needs to complete the current tools for assessing patients' mobility status limits the evaluation. Additionally, there are a limited reliable and valid tool to assess the mobility of hospitalized patients. To effectively monitor a patient's progress and deliver appropriate care, acute care nurses require a reliable instrument

for bedside mobility assessments that is simple to use. BMAT could also be a part of physiotherapists assessments, since they are an important member of the early mobility team (11). The purpose of this review is to investigate the application of BMAT 2.0 as a mobility assessment tool for hospital staff and compare it to the other more commonly used assessment tools.

Banner mobility assessment tool (BMAT)

According to nurses, Banner Mobility Assessment Tool (BMAT) is an efficient resource (2) to assess early mobility in patients in the hospital. It is usually stored in hospital's electronic medical record (EMR) (2) for ease of access.

Performing assessment

Patients are categorized as having a mobility level of 1, 2, 3, or 4 based on how effectively or poorly they perform at each evaluation level of the BMAT tool (2). Nurses and support personnel are trained on the appropriate technology for patients at each station using educational resources and how-to apply the tool to the patients depending on their needs. The tool explicitly specifies the following criteria: (i) the use of walkers, crutches, canes, and prosthetic legs by progressing patients. (ii) the assessment process and determination of pass or fail. (iii) the role of the nurse in assessing, strengthening, and advancing patients. (iv) the growth from level 3 to level 4.

BMAT 2.0 primarily focuses on the previous level of function (PLOF), discharge planning, and goals for mobilizing patients who meet all four assessments. Additionally, it addresses the management of bilateral non-weight-bearing patients and patients under bed rest orders. Nurses typically perform BMAT 2.0 upon patient admission, during each shift, and whenever there is a significant change in the patient's condition. This assessment generally takes about two minutes to complete. In "safe mode," it enables the care team to evaluate the patient's degree of mobility, plan and organize ways to reinforce and to improve mobility, aim for the appropriate piece of equipment.

The BMAT is a valuable tool for care teams to evaluate mobility. It can be utilized by nurses to assess patients' mobility, integrated into early assessments by physiotherapists, and serve as a means for the interdisciplinary team to discuss mobility status.

Bedside mobility assessment tool (BMAT)

The BMAT was created to evaluate a patient's functional state securely rather than relying solely on gait analysis (14). Historically, mobility evaluation was carried out without a procedure. A mobility evaluation should be chosen with the needs of the population it is intended for in mind (16). Clinicians can access a baseline of patient mobility capability with the BMAT (14). The score gives the healthcare provider a person-specific intervention that involves the patient and helps lower falls when a patient's functional ability fails to advance through the phases. Using EMR tools that connect assessment results with safe patient handling and mobility (SPHM) technology, mobility assessment documentation has been utilized to enhance communication within the care team.

As discussed above, BMAT is a mobility assessment tool used primarily by the nurses. The tool classifies a patient in four levels depending on completion of a task, equipment used, and caregiver assistance. The detailed description of the tool is provided in table 1.

Table 1: Describes the BMAT assessment tool in details. Each cell also clearly describes the steps to complete the assessment and grading.

Response	Task	Response & No. of Caregivers	Fail =choose most appropriate equipment/ device(s)	Pass
Assessment level 1 assessment of: -trunk strength -seated balance	Sit and shake: Ask the patient to sit up straight and rotate* to a sitting position at the side of the bed from a semi-reclined position; they can use the bedrail to do so. Observe how well the patient can stay in the bedside posture. Make sure the patient crosses his or her midline when you ask them to reach out and grasp your hand for a shake.	Sit: The patient can follow orders and has some trunk strength; if a patient can maintain a sitting balance for more than two minutes (without caregiver assistance). Caregivers may try weight-bearing. Shake: the patient has significant upper body strength, awareness of the body in space, and grasp strength. Caregivers: Minimum 2 or more	mobility level 1 Use total lift with sling and/or repositioning sheet and/or straps. Use lateral transfer devices such as roll board, friction reducing (slide sheets/tube), or air assisted device. Note: if patient has 'strict bed rest' or bilateral 'non-weight bearing' restrictions, do not proceed with the assessment; patient is mobility level 1.	Passed assessment level 1 = proceed with assessment level 2.
Assessment level 2 assessment of: -lower extremity strength -stability	Stretch and point: Place the patient's both feet on the floor (or a stool) with their knees no higher than their hips while they are seated at the side of the bed. Request that the patient extend one leg, straighten the knee, and flex the ankle pointing the toes. Repeat with the opposite leg if necessary.	Patient exhibits lower extremity stability, strength, and control. May test only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast). Caregivers: Minimum 2 or more	mobility level 2 Use total lift for patient unable to weight- bear on at least one leg. Use sit-to-stand lift for patients who can weight-bear on at least one leg.	Passed assessment level 2 = proceed with assessment level 3.

Assessment level 3 assessment of: -lower extremity strength for standing	Stand: Have the patient use an assistive equipment (cane, bedrail) to raise themselves from the bed or chair (sitting to standing). The patient must be able to lift their buttocks off the bed and hold them there for five counts and may come back Note: consider your patient's cognitive ability, including orientation and Confusion Assessment Method (CAM) assessment if applicable.	Patient exhibits upper and lower extremity stability and strength. May test with weight-bearing on only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast). If any assistive device (cane, walker, crutches) is needed, patient is mobility level 3. Caregivers: 1 to 2	mobility level Use non-powered raising/stand aid; default to powered sit-to-stand lift if no stand aid available. Use total lift with ambulation accessories. Use assistive device (cane, walker, crutches). Note: patient passes assessment level 3 but requires assistive device to ambulate or cognitive assessment indicates poor safety awareness; patient is mobility level 3.	Passed assessment level 3 and no assistive device needed = proceed with assessment level 4. Consult with Physical therapist when needed and appropriate.
Assessment level 4 assessment of: -standing balance -gait	Step: At the bedside, ask the patient to march in place. Ask the patient to take a step forward and then to put each foot back. The patient should be stable when carrying out tasks. Check for stability and an awareness of safety.	Patient exhibits steady gait and good balance while marching, and when stepping forwards and backwards. Patient can maneuver necessary turns for in-room mobility. Patient exhibits safety awareness. Caregivers: 0 to 1	mobility level 4 If patient shows signs of unsteady gait or fails assessment level 4, refer back to mobility level 3; patient is mobility level 3.	mobility level 4 modified independence Passed = no assistance needed to ambulate; use your best clinical judgment to determine need for supervision during ambulation.

Other current patient mobility assessment options and their limitations

Various types of mobility assessment tools are used in healthcare settings to evaluate an individual's ability to move and perform daily activities. Each tool has its unique characteristics, strengths, and limitations (4). Table 2 provides an overview of the description, benefits, and drawbacks of each tool used to evaluate patient mobility (4).

Patient mobility assessment tools	Description	Advantages	Limitations
Timed Up and Go (TUG) Test	This test measures the time it takes for an individual to stand up, walk a short distance, turn, walk back, and sit down	The advantage of this tool is quick to administer, and minimal equipment requirement	Primarily it assesses the basic mobility, but may not capture the complex movements
Berg Balance Scale (BBS)	BBS assesses the balance through tasks like standing on one foot, turning, and reaching	Its advantages include providing a detailed assessment of balance	Time-consuming, and may have a ceiling effect for mild impairments
Functional Independence Measure (FIM)	FIM evaluates an individual's ability to perform activities of daily living, including mobility tasks	It comprehensively assesses the functional independence	Time-consuming, and relies on observer ratings
Dynamic Gait Index (DGI)	DGI assesses an individual's ability to modify gait in response to various tasks	It focuses on dynamic aspects of gait and balance	It may not be suitable for severe gait impairments
Six-Minute Walk Test (6-MWT)	6-MWT measures the distance an individual can walk in six minutes	It assesses the endurance and cardiovascular fitness	It gives limited information on specific components of mobility
Instrumented Gait Analysis (IGA)	IGA uses technology such as motion capture systems to analyze various aspects of gait	It provides objective data on gait parameters	The main disadvantage of this test is it requires specialized equipment and expertise
Self-Reported Scales (Activities-Specific Balance Confidence Scale)	In this test, individuals rate their confidence in performing specific activities without falling	It incorporates the patient's perspective	It is subject to bias, and may not align with objective measures, which is the major disadvantage
Gait Speed Assessment (GSA)	GSA measures the time it takes for an individual to walk a specific distance	The method is quick and easy to measure	limited in assessing dynamic movements
Quick Five and Quick Three	The Quick 5, developed by a registered nurse and a PT, formed the foundation for a research project that evolved into the Quick 3.	It is more accessible and easier to administer	This tool guides patients through three functional tasks but falls short in fully accommodating patient limitations or addressing the abilities of ambulatory patients.

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Egress test	Created by a physical therapist. The patient begins by doing three repetitions of the sit-to-stand exercise, marching in place, and advancing one foot forward and back with each step at the bedside.	The advantage of this test is quick to administer, and minimal equipment requirement	This test ignores the patient's bed mobility, also it is inappropriate for some patients such as those unable to bear weight on one or both legs and only provides minimal guidelines for nurses regarding the use of SPHM technology.
Bedside Mobility Assessment Tool	Focuses on assessing a patient's mobility, transfers, and functional movements at the bedside	Accessibility: Can be conducted at the patient's bedside, minimizing disruptions and discomfort. Real-world simulation: Provides insights into practical challenges faced by patients in the hospital environment. Timeliness: Offers a quick assessment of mobility, suitable for dynamic acute care settings.	

Limitations of current mobility assessment tools

While numerous mobility assessment instruments are available, they all have distinct shortcomings. The patient is first asked to get out of an armchair, walk three meters, turn, and then return to the chair before taking a seat in the Timed Get Up and Test. However, it offers no advice on what to do if the patient cannot support their weight, walk, or maintain a seated balance (3). On the other hand, a tool like Quick 5 offers very few suggestions on safe patient handling and the use of mobility technology. Next, the egress test, ignores the patient's bed mobility or standing technique, or it may be inappropriate for some patients (such as those unable to bear weight on one or both legs) and only provides minimal guidelines for nurses regarding the use of safe patient handling and the use of mobility technology (3).

Applications of BMAT

Utilizing the bedside mobility assessment tool to reduce the length of stay

The length of stay (LOS) in acute care hospitals is a critical metric influencing patient outcomes and healthcare costs. Prolonged hospital stays are associated with increased risks of complications, functional decline, and healthcare expenses. But the effective use of bedside mobility assessment tools presents an opportunity to identify early mobility issues, implement targeted interventions, and potentially reduce the length of hospital stays (5).

Rationale for bedside mobility assessment

Bedside mobility assessments offer a practical and timely means of evaluating a patient's functional status directly in their hospital environment. By focusing on mobility, transfers,

A streamlined and targeted approach to patient care, guided by bedside mobility assessments, has the potential to reduce healthcare costs associated with prolonged hospital stays, unnecessary tests, and increased resource utilization (6).

BMAT can be adequately applied in different departments of a hospital, from Emergency department to the ICU.

Use of the bedside mobility assessment tool to improve emergency department (ed) safety

The most frequent adverse event in acute care settings documented in the healthcare industry is avoidable patient falls (12). Nearly seven hundred thousand to one million Americans fall in hospitals each year (Agency for Healthcare Research and Quality (AHRQ), 2021). ED is usually the first hospital location most patient's encounter. A detailed analysis of the patient demographics and the features of the patients who fall in the ED are necessary to determine the best approach for preventing the falls. Most individuals who fall in the ED are younger than the 65-year-old, and usually fell between 15.00 and 18:00 hours (13). Hospital staff can more effectively assess the risk of patients' fall using standardized fall risk instruments and strategies. Following which, safe patient handling and mobility technology can prevent as many as 13% of falls (16, 19, 20). Along with improving worker safety, this approach also complies with the American Nurses Association's (2015) recommendations to reduce manual lifts, a standard procedure for patient transfers and moves at the project site. By determining a patient's degree of mobility, the BMAT assessment equips patient caregivers with valuable information and helps them quickly identify the appropriate equipment for better healing and recovery (Boynton et al. 2020) (14).

Implementation of the bedside mobility assessment tool in the ambulatory care setting

Safe patient care depends on the effectiveness of nursing assessments. The nursing process is a systematic, patient-centered manual. The five crucial steps associated with this are evaluation, diagnosis, preparation, execution, and assessment. In order to keep patients safe, nurses must take all necessary precautions (7). Almost 30% of patient injuries happened during post-procedural sedation treatment, particularly during lateral transfers and repositioning. Falls among the elderly are common and can cause serious injuries as well as occasionally result in death (8). A systematic analysis of literature focusing on fall risk assessment revealed that the mobility assessment category was the most trustworthy area to evaluate in order to determine fall risk (9). Mobility strategies have been shown in an increasing amount of research to protect patients and nursing personnel while handling patients (10). Appropriate operation and training of each unique body system is facilitated by mobility, to ensure the safety and proper assessment of patients prior to their discharge which is imperative.

Early mobility in the intensive care unit

An intensive care unit (ICU) patient's immobility may have a detrimental effect on their condition and extend their LOS. An evidence-based strategy for early mobility was found to be lacking at the site where treatment is being given. The impact of this protocol on ICU LOS has been ascertained. For four weeks, the research was carried out in a southern California urban community hospital (17). Patients in the neighborhood hospital ICU where these experiments were conducted stayed mostly immobile despite research suggesting that mobility is advantageous. Therefore, it is suggested that the hospital needs a protocol in place for mobilizing patients. While creating mobility programs, organizational culture has a significant influence to play (17). The lack of programs in the project context indicated an inferior level of care at a potentially higher cost, given the magnitude of the benefits associated with mobility. In the community hospital ICU context, Jones et al. (15) noted the significance of applying evi-

dence-based treatments to support early mobility programs using the BMAT. Early mobility programs in the ICU have reduced the pressure, generation of ulcers and ICU length of stay, if patient care is improved (18;19). A few of these programs have used the BMAT, but research has yet to reveal how well the BMAT works in a community hospital context compared to the other tools. Mobility treatment is used in the BMAT program as an evaluation and treatment tool to standardize and enhance the movement patterns of ICU patients.

In an investigation, two groups of ICU patients have been compared using a quasi-experimental design (17). A quantitative methodology centered on the gathering of discrete data was employed for this research. The patients in the medical-surgical ICU made up the population. The project's participants were given mobility therapies based on the BMAT or current practice interventions before the BMAT-based program. In Los Angeles, California, a 101-bed community hospital housed a 12-bed medical-surgical intensive care unit (17). In this study the BMAT intervention served as the independent variable, while the ICU LOS served as the dependent variable. By utilizing the BMAT items for mobility, the study further supports early mobility programs in the ICU. Further, the project can serve as a model for other establishments attempting to introduce mobility initiatives.

Conclusions

In summary, BMAT holds a significant position among various tools for assessing mobility, each offering unique contributions to patient care across diverse healthcare environments. The comprehensive scope of BMAT, which includes assessments of transfers, sitting balance, and functional movements at the bedside, aligns effectively with the requirements of acute care facilities. However, its value is further amplified when used alongside other mobility assessment tools. The integration of BMAT within acute care settings presents a practical approach to identifying, addressing, and preventing mobility-related issues, leading to reduced hospital stays. By incorporating these assessments into a holistic and interdisciplinary framework, healthcare professionals can optimize patient outcomes, streamline care delivery, and facilitate a smooth transition from hospitalization to home or other care settings. Introducing e-learning initiatives to educate nurses about BMAT usage in acute care settings represents a strategic and innovative method to enhance clinical practice standards. Leveraging technology to provide targeted and accessible training equips nursing staff with the necessary knowledge and skills for conducting effective bedside mobility assessments, thereby enhancing patient care quality and outcomes.

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Conflict of interests

There are no known conflicts of interests.

Ethical committee approvals

Not applicable.

Data availability

Not applicable.

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