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Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses

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Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses: Review of Literature

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This Doctor of Nursing Practice (DNP) Project is approved as a credible and independent investigation by a candidate for the DNP degree and is acceptable for meeting the project requirements for this degree. Acceptance of this DNP Project does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Abstract

Introduction: Burnout and job dissatisfaction are plaguing nurses, with over half of healthcare workers reporting feelings of burnout. Workload demands are cited as a leading dissatisfier. Acuity-based assignments (ABAs) are used to predict the needs of patients and equitably distribute workload among nurses.

Evidence Summary: A review of the literature was completed by searching four evidence databases with defined inclusion and exclusion criteria. A total of 12 articles met inclusion criteria and were selected for literature review and critical appraisal. Evidence shows many existing acuity measures capture direct patient care but fail to represent much of the 'unmeasurable' indirect work that creates turbulence in nursing workload. The evidence also supports that including staff input to capture the workload specific to their practice setting has positive outcomes on satisfaction and burnout.

Gaps: There has been little research conducted regarding ABAs in the inpatient rehabilitation setting. There is also a need for higher-level evidence for ABAs across all inpatient settings.

Recommendations for Practice: This review of literature suggests the development of an ABA tool that is adaptable to specific patient populations, like inpatient rehabilitation, to equitably distribute nursing workload and improve nurse satisfaction.

Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses: Review of Literature

Modern healthcare is highly focused on providing quality care and outcomes while maintaining or decreasing costs. A nation-wide nursing shortage, amplified by a global pandemic, has highlighted safe staffing as an important factor for quality outcomes and staff satisfaction (American Nurses Association [ANA], 2017). Attention has been placed on nurse-patient ratios (the number of patients under one nurse's care), but this approach has been highly scrutinized. As patients become more complex, the number of patients assigned to a nurse is a poor predictor of the amount of direct and indirect care required throughout a shift (Welton, 2017). Patient acuity is being explored as a promising way to predict patient needs and divide work equitably among nurses.

Background

In healthcare, patient acuity is based on the severity of a patient's illness or condition and the intensity of care that patient will require from professional staff (Watson, 2022). Acuity can vary widely on a patient-by-patient basis, and many factors contribute to determining a patient's acuity level. Direct patient factors such as assessments, medication administration, and wound care all contribute to a patient's acuity and the amount of care required for that patient (Acar & Butt, 2016).

Direct patient care needs are not the only elements impacting the responsibilities of a nurse. A significant portion of a nurse's shift is spent on indirect patient care activities. Tasks such as documentation, care planning, phone calls, and medication preparation all require significant attention from nursing, and can often consume a larger portion of the shift than direct hands-on care (Acar & Butt, 2016). The responsibility of

caring for direct and indirect patient needs in addition to a nurse's capacity to accomplish that responsibility is generally considered a nurse's workload (Sir et al., 2015). However, nursing workload is inconsistently defined, and the terms acuity and workload are often used interchangeably in literature and the clinical setting (Browne & Braden, 2020; Sir et al., 2015).

Patients admitted for the same diagnosis can have widely varying acuities based on individual characteristics and comorbidities (Watson, 2022). Patient acuity is typically derived from nursing assessments, and there are countless acuity models and methods employed by a variety of organizations (Al-Dweik & Ahmad, 2020). Wide variations exist in whether acuity is determined with an independent tool or is calculated by the electronic health record (EHR). Additionally, different acuity methods are often utilized by different units within one hospital or organization.

Patient acuity is a powerful tool that can inform several aspects of nursing workforce distribution within a hospital. It is important to distinguish between acuity-based staffing and acuity-based assignments (ABAs). Acuity-based staffing is used by organizations when forecasting and scheduling nurses based on historical trends of expected patient volumes, services, and care requirements (ANA, 2017). Units may have a predictable weekly cycle of admissions and discharges based on a set surgical schedule or could have their census impacted based on seasonal trends, such as influenza. While acuity-based staffing provides scheduling and personnel decision support and has become a focus in recent years due to nursing shortages and increased need due to the COVID-19 pandemic, patient acuity can be applied to the process of creating nurse-patient

assignments (NPAs) to ensure equitable distribution of workload across nursing staff on a shift-by-shift basis.

Patient acuity is utilized in ABAs to systematically distribute patients to create balanced, equitable assignments among the nurses who are working a particular shift. The assignment of patients to specific nurses, known as NPAs, is typically done by the unit charge nurse (Acar & Butt, 2016; Al-Dweik & Ahmad, 2019, 2020; Massarweh et al., 2017). These NPAs are frequently based on nurse-patient ratios and the geographic location of patients on a unit. Charge nurses typically use their clinical judgement to subjectively match patients to nurses, creating opportunity for bias, error, and variability among charge nurses.

Significance

Burnout and job dissatisfaction are epidemics among nurses. According to the ANA (2023), a nationwide study found that 55% of health care workers report feelings of burnout. Staffing challenges have repeatedly been cited as a leading dissatisfier in the nursing profession (Gleim, 2015). The ANA has cited burnout, feeling undervalued, and high nurse-patient ratios as major reasons why nurses are leaving the profession (2023). Unfortunately, there is no immediate solution to these challenges. With an expected wave of nurse retirements over the next 15 years and nursing faculty shortages limiting program enrollments, nursing workforce shortages, exacerbated by the pandemic, are projected to persist (American Association of Colleges of Nursing, 2022).

Ideally, burnout and excessive workload would be combatted by hiring more nurses, but there are significant barriers to this solution. Not only will nursing workforce numbers continue to trend low, but the overall population is aging, meaning increased

need for geriatric care and care for individuals with chronic diseases and comorbidities (American Association of Colleges of Nursing, 2022). With the current trend and projected nursing workforce, it is vital to develop tools that optimize NPAs. In 2017, the ANA released a Workforce Management Statement with comments regarding acuity-based staffing and NPAs. The statement encourages organizations to utilize acuity data when establishing staffing policies, when matching staffing to patient needs, and when assigning nurses to patients (ANA, 2017). Interventions to utilize patient acuity to equitably distribute workload are being explored as solutions to ease burnout and improve the overall wellbeing of existing nurses. These interventions drive the question this review of literature seeks to answer.

PICOT

The population, intervention, comparison, outcome, and time (PICOT) question that guided this review of literature is: Among nurses working in an inpatient rehabilitation facility (P), how does the implementation of acuity-based assignments (I), compared to current nurse-patient assignment practices (C), impact nurse satisfaction and burnout (O) over 12 weeks (T)?

Literature Search

A review of the literature was completed by searching PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Academic Search Premier, and PsychInfo databases for relevant articles using the following key words: *nursing, acuity, workload, acuity-based assignments, satisfaction, burnout, work-life balance,* and *inpatient rehabilitation*. Inclusion criteria included peer-reviewed articles published between 2015 and 2023, written in English, and focused on the inpatient adult population.

Exclusion criteria included articles about outpatient, pediatric, obstetrics and gynecology, and psychiatry populations. Articles specific to staffing, nurse-patient ratios, and missed nursing cares rather than NPAs and nurse satisfaction were also excluded.

Searching for rehabilitation-specific evidence yielded four articles among these databases. After screening titles and abstracts, two of these articles were chosen for literature review. When the search was expanded to include all inpatient adult care settings, 128 articles were generated. Titles and abstracts were reviewed. A total of 12 articles were selected for literature review and compiled into an evidence table (Appendix A). Using the Johns Hopkins Nursing Evidence-Based Practice model (Dang & Dearholt, 2017), the articles were graded as follows: four level II articles, two level III articles, and six level V articles. Two articles were evaluated to be of high quality, and the remaining 10 designated good quality.

Evidence Summary

The review of literature revealed key themes that answer the PICOT question: nurse-patient assignments, acuity-based assignments, unit-specific needs, nursing workload and environment, unmeasurable work, and other outcomes.

Nurse-Patient Assignments

Traditionally, the foundation of NPAs has been the nurse-patient ratio (Acar & Butt, 2016; Al-Dweik & Ahmad, 2019; Eastman & Kernan, 2022; Massarweh et al., 2017; Riley et al., 2021). Nurse-patient ratios operate on the idea that if each nurse cares for an equal number of patients, the workload will be evenly distributed. Different settings may operate with a different standard nurse-patient ratio, such as one or two

patients to each nurse in an intensive care unit setting versus one nurse to five patients in the inpatient rehabilitation setting as described by Ifejika et al. (2019).

So much emphasis has been placed on the nurse-patient ratio that some states have even enacted legislation regarding ratios (Eastman & Kernan, 2022; Hummel et al., 2020; Massarweh et al., 2017; Sir et al., 2015). There are 14 states that have legislation that addresses nurse-patient ratios and/or require reporting of nurse staffing in hospitals: California, Connecticut, Illinois, Massachusetts, Minnesota, Nevada, New Jersey, New York, Ohio, Oregon, Rhode Island, Texas, Vermont, and Washington (ANA, 2022). California's legislation mandates that nurse-patient ratios should be balanced (Massarweh et al., 2017). The language of this legislation has faced great criticism due to its lack of consideration for variations in the needs of individual patients or nursing competencies and characteristics (Eastman & Kernan, 2022; Hummel et al., 2020; Massarweh et al., 2017; Sir et al., 2015).

The responsibility of creating NPAs typically lies with the unit charge nurse. Along with consideration of nurse-patient ratios, NPAs are commonly allocated based on geographic location of patient rooms and direct patient care activities with little consideration of the indirect tasks required throughout the shift (Acar & Butt, 2016; Eastman & Kernan, 2022). Charge nurses are asked to use their personal judgement, clinical expertise, and knowledge about the strengths and weaknesses of any given nurse working the upcoming shift to assign patients to nurses (Acar & Butt, 2016; Al-Dweik & Ahmad, 2019; Eastman & Kernan, 2022). Without standardization, inconsistencies in the assignment creation process arise from charge nurse to charge nurse. This subjective

approach can result in an inequitable distribution of workload, which contributes to burnout and dissatisfaction among nurses (Eastman & Kernan, 2022).

Acuity-Based Assignments

Developing NPAs is a high-level task that demands a great deal of cognitive energy. It requires an understanding of the patients, the nurses, and overall unit culture, and it can have a profound impact on both patients and nurses (Massarweh et al., 2017). Acar and Butt (2016) and Massarweh et al. (2017) both describe that the task of creating NPAs can occupy over 30 minutes of the charge nurse's time and attention for each shift, distracting from the unit, the patients, and the other nurses who rely on them as a resource.

Preexisting Tools

Utilizing a tool for the creation of ABAs has gained recent attention across many clinical settings. Several articles from the literature implemented established tools to evaluate the impact of ABAs. A 250-bed teaching hospital in Jordan adapted the Perroca patient acuity tool (PAT) to fit the needs of the facility and implemented the tool over the course of 3 months (Al-Dweik & Ahmad, 2019). They found a statistically significant increase in total nursing satisfaction ($p = .012$), workload satisfaction ($p = .019$), and standard of care provided ($p = .017$) post-implementation. Additionally, this research team conducted a descriptive phenomenological qualitative study to evaluate post-implementation themes. The 13 nurses who participated unanimously affirmed the Perroca PAT was easy to implement, allowed for more effective time management, and helped inform selection criteria for creating NPAs (Al-Dweik & Ahmad, 2020).

In a quality improvement project, Firestone-Howard et al. (2017) adapted a PAT developed by Harper and McCully to the needs of a 40-bed pulmonary medicine unit over a 2-month period. Though the results were not statistically significant, the intervention showed a 20.84% (p = .2443) improvement in nursing satisfaction with the acuity of their assignments, and an 8.34% (p = .7661) improvement in satisfaction with the equity of their assignments. Satisfaction in assignments based on acuity decreased 14.34% (p = .6662) post-implementation, but a focus group identified that this was likely due to changing assignments during a 12-hour shift to accommodate changes in acuity and oncoming 8-hour shift nurses. Implementing preexisting acuity tools has shown to be successful, but it is important to note that these existing tools were adapted to fit the unique needs of the implementation settings.

Developing New Tools

Many articles detailed the development of an ABA tool to meet the needs of a specific unit or organization. Because improving nurse satisfaction is the goal of ABAs, it is critical to involve the nurses in the development of these tools. Pre-implementation surveys were a common way to gather nurse input. Eastman and Kernan (2022) administered a pre-implementation survey to nurses to determine which elements are important to consider when determining patient acuity. Sir et al. (2015) utilized a similar process by surveying nurses to establish the impact of patient acuity indicators on their perceived workload. These surveys informed the development of ABA tools that improved nurse satisfaction. Sir et al. (2015) achieved statistically significant improvement for overall perceived workload ($p < .001$), balanced perceived workload across nurses ($p < .001$), and minimizing actual patient acuity ($p < .001$). Eastman and

Kernan (2022) also reported improvements in satisfaction with distribution of acuity and equity.

Other articles garnered staff input through workshops and focus groups. Ifejika et al. (2019) utilized focus groups to develop the 13 variables that would be included in their Rehab MATRIX. This tool would go on to be implemented by Riley et al. (2020) to achieve a 35% (p = .0013) increase in satisfaction scores post-intervention. Acar and Butt (2016) considered input from unit charge nurses when developing two automated ABA models. Alongside mathematical analysis, charge nurses were consulted to determine real-world feasibility of the proposed models. They concluded that Model 1, which minimizes the weighted sum of the maximum total patient acuity scores, was able to mathematically capture the task of creating equitable NPAs.

It is worth noting that staff participation in generating an NPA tool does not equate to buy-in or success of that tool. In a quality improvement project conducted on a medical/oncology unit, nursing staff were included in the development and revision of an ABA that was implemented over an 8 week period (DiClemente, 2018). Staff were surveyed pre- and post-implementation regarding their satisfaction with their assignments and their daily workload. An increase in job satisfaction was demonstrated, however, the authors noted a small percentage of staff participated in the pre- and post-implementation surveys. Adherence with the tool remained low throughout implementation, therefore staff elected not to continue use of the tool.

Unit Specific Needs

Authors of several articles highlighted the importance of considering the needs of the patient population specific to the implementation unit. Massarweh et al. (2017)

included a visual indicator in their tool to highlight patients receiving chemotherapy during their project implemented on an oncology unit. The unique physiologic and psychological needs of pulmonary medicine patients were included in the acuity tools implemented in two separate quality improvement projects (Eastman & Kernan, 2022; Firestone-Howard et al., 2017). The Rehab MATRIX contains acuity variables that reflect the physical and neurological limitations of patients commonly cared for in the inpatient rehabilitation setting (Ifejika et al., 2019; Riley et al., 2021). The idea that acuity varies between patients reinforces the notion that each patient population will have its own specialized needs, and the set of criteria used to evaluate those needs must be adapted to each population as well.

Nursing Workload and Environment

Aside from the implementation of ABA tools, a common theme identified during this literature review was the discussion of what comprises a nurse's workload and the environmental factors that impact workload. As Acar and Butt (2016) describe, most ABA models have focused on capturing the acuity of the patient, which concentrates measures of workload on direct patient care activities. This approach can create a gap between measured and actual workload of nursing.

Sir and colleagues (2015) describe the difference between objective acuity and perceived workload. Workload can vary dramatically based on a given nurse's skills and preferences, meaning that a single patient can present drastically different perceived workloads for two different nurses. This team aimed to capture the phenomena of perceived workload by surveying staff with the request to rate the impact of certain patient acuity indicators on their perceived workload. They were able to develop

mathematical models to reduce the overall perceived workload, balance perceived workload across nurses, and still minimize actual patient acuity (Sir et al., 2015).

Acar and Butt (2016) explored how nurses spend their time during a 12-hour shift. Through continuous direct observation, trained observers followed nurses for their entire shifts, documenting their activities, and the amount of time each activity consumed. Analysis showed that nearly half (45.9%) of the nurses' days were spent completing indirect care tasks, such as documentation and medication preparation. Direct patient care (assessments, medication administration, hygiene, etc.) accounted for 19.3% of the shift, and other notable percentages included in-transit time (traveling between unit locations) and fetching (searching for and collecting supplies). While fetching only accounted for 1.8% of total time, fetching occurrences were 9.6% of total activities during a shift, indicating that nurses are frequently interrupted by the need to search for and gather necessary supplies (Acar & Butt, 2016). Interruptions like fetching break the nurse's focus, increasing the time it takes to complete a task as well as the risk for error. Nurses may also note these interruptions increase their workload, decrease their satisfaction with their work, and contribute to feelings of burnout.

Unmeasurable Work

Because of gaps identified between measured acuity and actual nursing workload, Browne and Braden (2020) conducted a sequential-mixed methods study to explore the variable of "turbulence," or the unanticipated work complexities and activities that occur in response to a rapidly changing and dynamic work environment. Local American Association of Critical-Care Nurses (AACN) members were surveyed with both qualitative and quantitative questions, and the narratives described work that was

necessary but not addressed in workload measures. A 15-item turbulence measure was established. To be considered turbulence, items had to be random or unpredictable, disruptive or affect another activity, or add complexity to the nurses' work (Browne & Braden, 2020).

When the 15-item turbulence measure was administered to AACN members nationwide, turbulence was strongly correlated ($p < .001$) with patient safety risk (Browne & Braden, 2020). Patient outcomes and providing quality care are important for nurses and contribute to their satisfaction. Patients with higher acuity are more likely to create random, unpredictable, disruptive, and complex work for nurses. There is emerging concern that managing turbulence has become a greater focus than patients' needs (Browne & Braden, 2020). Creating equitable NPAs can minimize the impact of turbulence on nurses to allow them to provide the kind of care they want to give their patients. This sense of a job-well-done fosters improved job satisfaction in nurses (Al-Dweik & Ahmad, 2020; Firestone-Howard et al., 2017).

Other Outcomes

Beyond nurse satisfaction and burnout, many articles highlighted other patient and financial benefits to ABAs as well. Hummel et al. (2020) found a slight increase in patient satisfaction scores during the pilot period. The rehab-specific tool described by Riley et al. (2021) specifically addresses cares correlated with hospital-based complications. Implementing an ABA tool to equitably distribute the work of intermittent catheterization, dysphagia management, and bed mobility can prevent complications like urinary tract infections, aspiration pneumonia, and pressure ulcers. Pappas et al. (2015) demonstrated that assessing patients' acuity needs during personnel considerations

decreased occurrences of falls, catheter-associated urinary tract infections, central line-associated bloodstream infections, and pressure ulcers, all outcomes tracked by the National Database of Nursing Quality Indicators.

Not only do ABAs improve patient outcomes, but there are financial considerations as well. Pappas et al. found a net $2 million cost reduction over eight quarters, decreased expenses in incidental overtime, length of stay, and cost per case. In their ABA tool, Massarweh et al. (2017) included a function to flag over- or underutilization of nursing hours based on patient acuity, and Hummel et al. (2020) used their tool to ensure high-quality care was delivered to every patient in a cost-effective manner. These findings suggest that equitable workloads are not only a staff satisfier but are also an effective patient safety and cost containment strategy.

Gaps in the Literature

This review of literature revealed gaps in the current body of evidence surrounding ABAs and nurse satisfaction in the inpatient rehabilitation setting. Only two articles specific to inpatient rehabilitation were found to meet inclusion criteria. The inpatient rehabilitation setting presents unique attributes and challenges. Patients receiving inpatient rehabilitation services have significant physical and cognitive impairments and are often being treated for multiple chronic and comorbid conditions. Patients who are recovering from a stroke may require medical management of cardiac arrythmias and new anticoagulation while the therapy team treats their hemiparesis, dysphagia, and global aphasia. A new below-knee amputee may need to learn how to be mobile and independent with one leg, while also receiving treatment for their uncontrolled diabetes and advanced kidney disease. The rehab nurse has a hand in every

step of the rehabilitation process. The very first criterion listed for medical necessity of inpatient rehabilitation facility admission by Centers for Medicare and Medicaid Service (2017) is the complexity of the patient's nursing services. Research in this specific setting is necessary to understand the needs of those who work and are cared for in this environment.

Expanding the search to broader inpatient settings revealed many more articles, but gaps remain. Of the ten additional articles that met inclusion criteria by expanding the search, five of them were identified to be quality improvement projects, which fall within the lowest level of evidence according to the Johns Hopkins Nursing Evidence-Based Practice model (Dang & Dearholt, 2017). This highlights the need for higher level research regarding ABAs and nursing satisfaction. It is worth noting, however, that Level I research is unlikely, because the intervention is not easily randomizable, nor is it possible to blind the research team or the participants.

Recommendations for Practice

Based on the findings from this review of literature, it is recommended that a standardized ABA tool be created that considers patient acuity as well as other aspects that contribute to the overall workload of nursing staff like indirect patient care, the care environment, and unmeasurable work. Because needs vary by patient population, this tool should be adaptable to a variety of inpatient settings, such as an inpatient rehabilitation unit. This would allow for standardized use across a health system, while still meeting the specialized needs of each unit. Implementation of this tool should facilitate the creation of equitable NPAs, supporting staff satisfaction and decreasing burnout.

Conclusion

Patient acuity is a promising predictor of the workload required to care for patients. Using patient acuity to develop NPAs is being researched to equitably distribute the workload of patient care across nurses. Direct patient care is not the only facet that contributes to overall nursing workload, and teams are working to capture the unmeasurable work that taxes a nurse's time and attention. Acuity-based assignments have been shown to successfully increase nurse satisfaction, decrease burnout, and demonstrate the ability to improve patient outcomes and reduce organizational cost. This makes ABAs a multi-faceted weapon against some of healthcare's biggest problems. Though there are gaps in the current body of evidence, especially regarding the inpatient rehabilitation setting, this review of literature emphasizes the benefits and supports the recommendation of collaborating with unit leadership and charge nurses to identify unit-specific variables and develop an ABA tool that captures nursing workload unique to the care environment.

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Appendix A

Evidence Table

Author & Year	Design, Level of Evidence and Quality	Sample	Setting	Intervention	Findings	Limitations	Application to the EBP
Acar, I. & Butt, S. E. (2016).	Quasi-experimental, Level II, Good quality	29-bed inpatient nursing unit with 45 full-time nurses	29-bed adult medical-oncology unit within a 380-bed medical center	Nurses were continually followed during their shifts by trained observers, who documented 45 distinct nursing activities within 10 categories. Unit charge nurses gave input about workload attributes and their weighted impact to develop two automated models for creating equitable patient assignments based on unit-	When distance traveled is factored in, both assignment models showed statistically significant lower total workload scores than actual assignments manually developed by the shift charge nurse. The models were not statistically different based on acuity scores alone. Consensus among charge nurses was that the Model 1 assignments were feasible and equitable to implement in practice. These	While the overall mathematical model is generalizable across many settings, the items identified as important for the implementation unit are not universal across all care settings. Time and resources would be required to identify pertinent measures in each specific care setting before implementation of the model is possible. Additionally, the methodology depends on charge nurses and bedside nurses to come to an understanding about how certain activities	The implementation setting currently utilizes a similar pre-implementation practice of charge nurses manually creating nurse-patient assignments. The implementation setting also has access to a hospital-wide acuity level generated by the EHR, but many unit-specific factors also impact the workload of each patient.

				specific indicators.	findings give evidence that proposed methodology was able to mathematically capture the task of creating equitable nurse-patient assignments.	impact their workload.	
Al-Dweik, G., & Ahmad, M. (2019).	Quasi-experimental, Level II, High quality	64 medical-surgical RNs	Medical-surgical wards of a private teaching hospital in Amman, Jordan	The Perroca patient acuity tool (PAT) was implemented as an evidence-based method of creating NPAs. The tool consists of 9 care areas that are scored from 1-4, and the scores informed nurse-patient assignments.	Pre- and post-intervention surveys were used to evaluate RN satisfaction with the Perroca PAT. There were statistically significant increases in overall satisfaction (p=.012), workload satisfaction (p=.019), and standard of care post-implementation (p=.017).	A major limitation of this study was that the hospital utilizes a non-electronic documentation system, so evaluation of patients relies on paper charts. Additionally, the sample size was borderline too small.	The implementation of a NPA protocol based on patient characteristics to improve nurse satisfaction is the goal of this EBP project. Satisfaction will be measured with pre- and post-intervention surveys as well.
Al-Dweik, G., & Ahmad, M. (2020).	Descriptive Phenomenological qualitative study, Level III, Good quality.	13 nurses; 7 in the nurse manager group (including	Medical-surgical wards of a private teaching hospital in	The nurses participated in two focus groups to evaluate	4 themes and 11 subthemes were identified. Overall, participants expressed	Participants were asked to rely on their memory of prior to implementation to answer questions and	This EBP project aims to evaluate RN satisfaction of the implementation of an acuity-based nurse-

		charge nurses) and 6 bedside nurses	Amman, Jordan	satisfaction of implementation of the Perroca PAT three months prior.	satisfaction with the effectiveness of the tool and ease of use. All participants recommended creating hospital policy implementing the Perroca PAT.	evaluate their satisfaction. Only 13 RNs from a 250-bed facility participated.	patient assignment intervention.
Browne, J. & Braden, C. J. (2020).	2- phase exploratory sequential mixed methods design, Level III, Good quality	*Pilot study*: 19 member nurses of a local AACN Nurses chapter. *Primary Study*: 269 responses to an AACN national survey	*Pilot Study*: Surveys were completed online via a secure website. The principal investigator was the only person with access to the website data. *Primary Study*: A national AACN eNewsletter was sent out requesting survey participation	*Pilot Study*: The survey consisted of 19 qualitative and 3 qualitative questions regarding working "turbulence" and results guided development of a 15-item turbulence measure. *Primary Study*: The turbulence measure developed after the pilot study was administered, and nurses were asked to describe their	"Turbulence" was identified as the degree to which a nurses' attention to a task is diluted or redirected by thought diversions, resource inadequacy, communication breakdown, or interpersonal relationships. 4 processes and 12 items were identified as a proposed measure of turbulence.	Nonresponse bias may have impacted results; some nurse reported not feeling comfortable describing the workarounds they performed. Because of the way the primary survey was distributed, it is impossible to determine nonreceipt and nonresponse rates.	This study highlighted the concept that unforeseen and undocumented "turbulence" creates a large burden on the daily workload of nurses. The study confirms that current workload measures fail to capture the intricacy of nursing workload.

				work-around experiences.			
DiClemente, (2018).	Quality improvement, Level V, Good quality	39 registered nurses	32-bed medical/oncology cancer care unit in a 210-bed community hospital in Illinois	Implement a standardized acuity tool in creating nurse-patient assignments to improve productivity and clinical outcomes. Results were evaluated via staff surveys pre- and post-intervention.	Compliance with use of the tool was inconsistent throughout the implementation period, and post-pilot ultimately chose not to continue with the method.	Statistical evaluation was not described in this article.	The goals and intervention of this QI project are aligned with the proposed EBP project. This article gives insight into a project that was not successful at implementing an acuity tool into developing nurse-patient assignments. Lessons can be learned about what did not work for DiClemente in the implementation of the proposed EBP project.
Eastman, D. & Kernan, K. (2022).	Quality improvement, Level V, Good quality	21 nursing staff members responded to the pre-survey, 26 responded to the post-survey	20-bed pulmonary progressive care unit within a 1000-bed Magnet-designated urban hospital system	Based on answers from the preliminary survey, a Patient Acuity Tool (PAT) was designed and implemented on the unit for 5 weeks before a posttest survey was administered.	Staff reported increased satisfaction in all five survey areas post-intervention. The tool is believed by staff to be an accurate representation of the patients' acuity.	Charge nurses were not asked to rate the use of the previous PAT on an initial survey, making comparison impossible. The PAT is not embedded into the EHR, which requires a separate paper form.	The intent of Eastman and Kernan's project and the method of implementation are congruent with the proposed EBP.

Firestone-Howard, B., Zedreck Gonzalez, J. F., Dudjak, L. A., Ren, D., & Rader, S. (2017).	Quality improvement, Level V, Good quality	35 RNs	40-bed pulmonary medicine unit in a 520-bed acute care hospital in southwestern Pennsylvania	A previously developed PAT was modified to fit the unit's population. Nurse satisfaction was assessed pre- and post-implementation.	While results do not achieve statistical significance, pre- and post-survey results trend in a favorable direction of improved nurse satisfaction with the use of the intervention PAT.	There was lack of consistency in scoring admissions. Interrater reliability was not tested. The PAT was not integrated into the electronic record, resulting in duplicate documentation for RNs.	The implementation of a nurse-patient assignment protocol based on patient characteristics to improve nurse satisfaction is the goal of this EBP project. Satisfaction will be measured with pre- and post-intervention surveys as well.
Hummel, C., Laabs, L. A., Tyczkowski, B., Teuteberg, B., Franzen, K., & Pelkola, J. (2020).	Quality Improvement, Level V, Good quality	56 surgical RNs	35-bed surgical department within a 517-bed acute care facility in the Midwest.	A patient acuity system was integrated into the facility's EHR that allotted point values for patient care tasks and orders, updated in real time as documentation was completed. This EHR-generated score was used by the charge RN to create equitable nurse-patient assignments. Satisfaction of staff was	For each of the five questions of the RN satisfaction survey, there was no significant difference between pre- and post-implementation scores. Press Ganey patient experience scores demonstrated slight increase for patient satisfaction during the pilot period compared to scores from the month prior to implementation.	This QI project utilized a small sample size, a short pilot period, and was implemented in one specific department. Because the organization was carrying out multiple initiatives to improve patient experience, it is not certain that the increase in patient satisfaction data described in the article can be attributed to the intervention.	A version of the acuity system integrated into the EHR described in this article is also currently in use at the proposed project setting. It is the intent of the proposed project to utilize the EHR-integrated tool, along with unit specific measures, to develop a standardized method for creating equitable nurse-patient assignments.

				measured with pre- and post-intervention surveys, and patient satisfaction was also assessed.			
Ifejika, N. L., Okpala, M. N., Moser, H. A., Watkins, J. N., Noser, E. A. (2019).	Non-experimental, Level III, Good quality.	19 RNs and 8 patient care assistants	24-bed IRF affiliated with a level 1 trauma center and a comprehensive stroke center	A focus group was used to develop a patient assignment grid based on 13 acuity variables specific to the IRF setting.	The tool was representative of the nursing effort required to provide high-quality patient care.	The tool developed in this study is specific to inpatient rehab, and therefore not generalizable to other inpatient care settings.	The specifics of the tool and the way it was developed are highly congruent with the implementation setting and goals for this EBP project.
Massarweh, L. J., Tidyman, T., & Luu, D. H. (2017).	Quality improvement, Level V, Good quality	21 nurse managers provided information regarding workflow, and individual nursing units provided feedback	Integrated multi-hospital system with 108 distinct adult inpatient nursing units	An eAssignment sheet was developed that incorporates the system's patient acuity scoring with decision support software to streamline the assignment-creation process.	Nurse managers reported perception that the eAssignment sheet contributed to safe care delivery and reduced time assessing workload and developing assignments. Additionally, it assisted in ensuring every patient was assigned to a nurse and that the number of nursing care hours fell within	The intervention outlined in this study focused more on ensuring every patient was assigned to a nurse, that mandates regarding patient ratios and break times are followed, and that shifts are not over- or under-staffed. While patient acuity measures are integrated into the tool, they are not the	This intervention is aimed at easing the burden of creating nurse-patient assignments and integrating existing patient-acuity technology into an efficient assignment creation process. This is the goal of the proposed EBP project.

					the target utilization demand by including visual aids in the tool.	focus of the intervention.	
Riley, Y., Stitt, J., Hill, C. M., Stutzman, S. E., Venkatachalam, A. M., Aguilera, V., & Ifejika, N. L. (2021).	Quasi-experimental, Level II, Good quality.	21 full-time rehabilitation nurses	Academic, hospital based IRF	MATRIX Staffing Grid (MSG) was implemented, containing 16 rehab-specific acuity variables used to determine patient acuity and create equitable nurse-patient assignments.	There was a statistically significant increase in total median satisfaction scores post-intervention, a 35% increase (p=.0013) after implementation of the MSG. It was determined that the MSG is feasible and appropriate for improving nurse satisfaction in relation to the nurse-patient assignment.	The study is not randomized and is implemented in a single setting.	The specifics of this tool and its implementation process are highly compatible with the implementation setting and the goals of this EBP project.
Sir, M. Y., Dundar, B., Barker Steege, L. M., & Pasupathy, K. S. (2015).	Quasi-experimental, Level II, High quality.	36 nurses; 23 oncology nurses and 13 surgical nurses	Oncology and Surgery units of an academic medical institution in the Midwestern United States.	Surveys were administered to establish the impact of patient acuity indicators on their perceived workload. Survey data and patient acuity scores were	Results showed that the proposed assignment model can improve nurses' work conditions and satisfaction by reducing and balancing their workload.	The study is not randomized and is implemented in a single setting.	This study aims to minimize discrepancies in acuity and perceived workload across nurse-patients. This is achieved by integrating existing acuity technology with input from unit staff about their perceived

				integrated into several models to achieve a balanced assignment regarding patient acuity and reduced overall survey-based perceived workload.			workload, which is congruent with the goals of this EBP project.

Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses: Methodology

BY

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Abstract

Background: With half of healthcare workers reporting burnout, job dissatisfaction and burnout are nursing epidemics. Staffing shortages and heavy workloads are leading dissatisfiers. Acuity-based assignments (ABAs) can predict patient needs and equitably distribute workload among nurses.

Local problem: Nurses of a 21-bed inpatient rehabilitation facility identified burnout related to workload. There was no standard practice for creating assignments, and the existing acuity measure was not rehab-specific.

Methods: An ABA tool was implemented over 12 weeks. Nurse satisfaction and burnout were measured with an abbreviated Copenhagen Burnout Inventory and the Nurse Satisfaction with the Quality of Care Scale, which were administered pre- and post-intervention.

Interventions: The charge nurses identified rehab-specific variables critical to the assignment-making process. These were compiled into an ABA tool. The tool was used to assess patient acuity and guide assignments.

Results: Survey results were evaluated with the Wilcoxon signed-rank and Mann-Whitney U tests. Pre- and post-implementation data revealed no significant difference in internal or external burnout or job satisfaction. No other observable trends were identified.

Conclusions: More investigation into nursing burnout and job satisfaction are required to understand and implement effective interventions.

Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses: Methodology

Problem Description

Nationwide, nurses are experiencing burnout and job dissatisfaction (American Nurses Association [ANA], 2023). Staffing challenges and workload have been identified as primary contributors to these problems (Gleim, 2015). Current trends and future projections anticipate that nursing shortages will persist, and patient populations will require increased care for chronic diseases and comorbidities (American Association of Colleges of Nursing, 2022). The ANA released the Workforce Management Statement in 2017, recommending organizations use patient acuity data when assigning patients to nurses (ANA, 2017).

These nationwide sentiments are echoed at the local level of this Doctor of Nursing Practice (DNP) project as well. In a performance improvement (PI) project completed on the implementation unit, staff recognized prevalent feelings of burnout, with nurses noting staffing issues as a primary source of dissatisfaction ([redacted], personal communication, March 21, 2023). Though recruitment and retention are priorities for the unit and organization, other strategies are necessary to address concerns of burnout and job satisfaction.

Available Knowledge

PICOT Question

A review of literature was conducted, guided by the following population, intervention, comparison, outcome, and time (PICOT) question: Among nurses working in an inpatient rehabilitation facility (P), how does the implementation of acuity-based

assignments (I), compared to current nurse-patient assignment practices (C), impact nurse satisfaction and burnout (O) over 12 weeks (T)?

Review of Literature

The literature highlighted the unmeasurable work and environmental factors that contribute to nursing workload. Acar and Butt (2016) analyzed that nearly half (45.9%) of a nurse's time during a shift is spent on indirect care tasks, such as documentation and communication with the care team, and a mere 19.3% of the shift was spent on direct patient care. Additionally, of the total tasks that occurred during the shift, 9.6% were instances of fetching, or searching for and collecting supplies. This indicates that nurses face frequent interruptions, which disrupt focus and increase risk of error and time to complete a task (Acar & Butt, 2016). Browne and Braden termed these unpredictable, disruptive complexities that occur in response to a rapidly changing work environment as "turbulence," and identified that patients with higher acuity are more likely to create turbulent tasks (Browne & Braden, 2020, p. 184).

The literature revealed that patient acuity is a promising factor for predicting workload. Utilizing acuity in the development of nurse-patient assignments (NPAs) can be effective when equitably distributing the workload of patient care across nurses. Using an acuity-based assignment (ABA) tool that captures unit-specific variables is critical to accurately identifying and equitably distributing workload (Eastman & Kernan, 2022; Firestone-Howard et al., 2017; Ifejika et al., 2019; Massarweh et al., 2017; Riley et al., 2021). The literature demonstrated this by detailing development of ABA tools (Acar & Butt, 2016; Eastman & Kernan, 2022; Ifejika et al., 2019; Riley et al., 2021; Sir et al., 2015), as well as the adaptation of existing tools to accommodate variables specific to the

setting in which they are used (Al-Dweik & Ahmad, 2019, 2020; Firestone-Howard et al., 2017).

Though nurse satisfaction and burnout were the outcomes of focus for this literature review, ABAs were shown to be productive in other ways as well. Hummel et al. (2020) saw slight increases in patient satisfaction during the pilot period for their ABA tool. Pappas et al. (2015) found that assessing patient's acuity needs during personnel considerations decreased falls, catheter-associated urinary tract infections, central line-associated blood stream infections, and pressure injury occurrences. Not only did patient outcomes improve, but Pappas et al. (2015) identified a $2 million reduction in cost related to decreased incidental overtime, length of stay, and cost per case over eight quarters.

Based on the findings of the review of literature, recommendations for practice include creation of a standardized tool that utilizes patient acuity and unit-specific variables to predict and equitably distribute workload among nurses.

Rationale

Evidence-Based Practice Model

The Johns Hopkins Evidence-Based Practice Model guided this DNP project, which operates in three phases known as the PET process: practice question, evidence, and translation (Dang et al., 2021). The practice question for this project was driven by unit survey responses in association with a PI project implementing a positive-feedback intervention. The evidence phase was addressed through the review of literature described above. The translation phase incorporated the findings of the literature review

into practice by developing and implementing an ABA tool, evaluating the outcomes, and communicating results and recommendations (Dang et al., 2021).

Change Theory

Thaler and Sunstein's Nudge Theory serves as the change theory for this project. This change theory is founded in the concepts that involving stakeholders in the change process will increase their buy-in to the change and its success, and that presenting change as an easy default choice and removing barriers to adoption will increase the likelihood that the desired outcome is met (Thaler & Sunstein, 2008). This project aimed to achieve lasting change by involving the charge nurses who would use the ABA tool in its creation and allowed them to rate the degree the tool influenced their assignments for each shift during the implementation period.

Context

Setting

The implementation setting for this project is a 21-bed inpatient rehabilitation facility located within a 545-bed medical center located in the Midwest ([redacted], 2024). This medical center is a certified level I adult and level II pediatric trauma center, a comprehensive stroke center, and is part of a greater healthcare enterprise that is made up of tertiary and critical-access hospitals, clinics, and long-term care facilities. The primary diagnoses served by this rehab unit are strokes, traumatic brain injuries, spinal cord injuries, amputations, as well as other medical conditions resulting in functional debilitation.

Sample

The rehab unit is primarily staffed by registered nurses (RNs) who are employed directly by the unit. There are 28 total RNs employed by the unit, including bedside RNs and charge RNs, and those who work full-time, part-time, and as needed (PRN). The rehab unit also contracts several travel RNs as an interim solution to address staffing challenges. To meet the flexible staffing needs across all inpatient units of the medical center, there is a group of RNs who are employed by the Central Resource Pool (CRP) who are periodically assigned to fill staffing needs on the rehab unit. On occasion, nurses employed by other inpatient units within the medical center may be reassigned from their home unit to care for patients on the rehab unit. This is locally referred to as being "pulled."

Participants included nurses employed directly by the rehab unit and any contracted travel RNs who began working on the unit prior to February 2024 and whose contracts extended through the entirety of the implementation and post-implementation survey period. This time frame ensured the travel RNs had exposure to the unit pre-implementation to allow for comparison post-implementation. Newly hired rehabilitation nurses were also subjected to the same inclusion criteria to allow for pre- and post-implementation comparison. Nurses from the CRP and pulled RNs were excluded from the sample due to most of their shifts being completed in a setting outside the rehab unit.

Intervention

The ABA tool (Appendix A) is a grid inspired by the Rehab MATRIX (Ifejika et al., 2019) with the columns labeled as each of the 21 rooms on the unit, and 12 variables and their descriptions listed as headings for the rows. The first variable listed in the ABA

is the Workload Acuity (WLA) score. The WLA score is generated by the electronic health record (EHR) of the implementation setting, and it calculates a score based on assessment documentation and past and future orders. This tool assigns a score and graded color (green = low acuity; yellow = intermediate acuity; red = high acuity), to each patient, indicating the projected intensity of work required to care for that patient for the upcoming shift. The WLA variable is one of two graded variables in the ABA, with green scoring as 1 point, yellow scoring as 2 points, and red scoring as 3 points.

The WLA calculation is very powerful and sophisticated, however it operates on the same rules for all adult inpatients regardless of setting or diagnosis across the enterprise. The review of literature indicated the importance of an ABA tool that incorporates the qualities and needs specific to a setting, so the WLA score was supplemented with 11 other variables, all identified by the unit charge nurses as critical to the inpatient rehabilitation assignment making process.

Of the 11 additional variables, one is graded as 1 point for blood sugar checks and sliding-scale insulin, and 2 points for patients with additional post-meal carb ratio insulin administrations. While diabetes management is not unique to the inpatient rehabilitation population, coordinating timing of blood sugar checks, insulin administration, meal tray deliveries, and carb correction around patients' therapy schedules creates considerable workload for rehab nurses. The remaining 10 variables center around rehab-specific documentation and communication, cognition, mobility, feeding, and continence barriers that commonly affect the rehab patient population and whose impact on nursing workload is not adequately conveyed by the WLA score. These 10 variables are scored as 1 point if the condition is present, resulting in a highest-possible score of 15 for a single patient.

Unit leadership and the charge nurses identified the tool should be a physical paper form rather than presented in an electronic format. The ABA tools were placed in the unit's staffing binder, where the charge nurses access the names of staff members scheduled for each shift and fill out staffing productivity documentation that is turned in to the unit manager. The charge nurse working the current shift made assignments for the upcoming shift and filled out the tool using their knowledge of the patients, chart review, and discussions with the bedside nurses to determine which variables applied to each patient. A score was totaled for all patients, and patients were designated as "low" (1-5), "moderate" (6-10), or "high" (11+) acuity. The charge nurse then used the information provided by the ABA tool, as well as their clinical judgment, to equitably distribute the patients to the nurses working the upcoming shift.

The charge nurses identified factors to be considered when creating assignments that do not impact a patient's acuity but can dictate which nurses can care for certain patients. For example, nurses who are scheduled for consecutive shifts should be assigned the patients they cared for on previous days to maintain continuity. Other examples include avoiding assigning patients on cytotoxic precautions to pregnant or breastfeeding nurses and ensuring patients with specialized rehab diagnoses (like spinal cord injuries) are cared for by rehab nurses rather than travel, CRP, or pulled staff.

Study of the Intervention

Prior to implementation of the ABA tool, the charge nurses and bedside nurses received education specific to their involvement with the project. Education for the charge nurses was presented at their monthly meeting by the DNP project manager. This included a PowerPoint presentation (Appendix B) with orientation to the ABA tool and

time for discussion and questions. Time was allotted during this meeting for the charge nurses to practice using the tool based on patients admitted to the unit at that time. The bedside nurses received an email in their organizational email accounts with a general overview of the project and a link to the pre-implementation survey. Education was also presented at unit huddle, which occurs daily during change from night shift to day shift. Unit huddle is time dedicated to sharing key information important for staff engagement and patient safety. This short meeting is typically led by the unit manager or the charge nurse from the night shift handing off to dayshift. During huddle, a short summary of the project was read by the individual leading huddle, and the message included a reminder to complete the online survey found in the email. Details of the survey can be found in the Measures and Analysis sections. The survey was open for a 2-week window prior to implementation, and huddle education was provided each day of the survey window.

After the pre-implementation survey window closed, implementation of the ABA tool began. Charge nurses used the tool as described to create nurse-patient assignments for the upcoming shift during the full 12-week implementation period. The completed ABA tools were kept in the staffing binder and collected by the unit manager every 2 weeks at the end of each pay-period. Collected tools were kept in a locked office accessible only by the unit manager.

At the conclusion of the 12-week implementation period, the post-implementation survey was administered to the charge nurses and bedside nurses via organizational email. The post-implementation survey window allowed 2 weeks for surveys to be completed, plus an additional week to garner more responses, with frequent reminders for completion both via email and verbally during unit huddle.

Measures

The Copenhagen Burnout Inventory (CBI) is an open access, public domain, 19-item inventory that was originally studied in people working in the human-services sector, including healthcare, and has been assessed to have very satisfactory reliability and validity in this population (Kristensen et al., 2005). The CBI consists of three scales, all measuring a different type of burnout: personal, work-related, and client-related. A 2021 cross-sectional study of emergency medicine residents identified an abbreviated version of the CBI using six of the items, four which indicate internal burnout, and two which indicate external burnout. The internal burnout factor demonstrated good reliability with an omega coefficient of 0.88, and the external burnout factor demonstrated excellent reliability with an omega coefficient of 0.91 (Barton et al., 2022). This 6-item, abbreviated CBI (Appendix C) was used to decrease survey burden with the goal of maximizing the response rate to the surveys and was measured with a 5-point Likert-type scale. Satisfaction was measured with the Nurse Satisfaction of the Quality of Care Scale (Appendix D; Alilyyani et al., 2022). This 5-item scale is available open access via the Creative Commons Attribution License and is measured with a Likert-type scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Two additional questions, or "bonus" questions, developed by the DNP project manager and the unit manager were included regarding the development and equity of NPAs on the unit.

Pre- and post-implementation surveys were administered via the REDCap online survey platform, and a link to the surveys was distributed via nurses' organizational email. Pre- and post-implementation surveys were coded to allow for matching during statistical analysis. Participants were asked to create a code using the first 4 letters of

their mother's maiden name followed by the number of their birth month. Participants were informed that participation in the survey was entirely voluntary, their responses would remain anonymous, and that proceeding with the survey served as their consent for participation.

The pre-implementation survey (Appendix E) assessed demographic data of nurses with four multiple choice questions. The demographics questions were followed by burnout and satisfaction questions. Participants were asked if they are a charge nurse, and a "yes" answer prompted three additional questions assessing their satisfaction with the assignment-making process.

On the post-implementation survey (Appendix F), all nurses received the same demographics, burnout, and satisfaction questions as pre-implementation. Participants were again asked if they are a charge nurse, and a "yes" answer triggered additional questions: three questions from pre-implementation about their satisfaction with the assignment-making process, and four questions about the viability of the ABA tool as a sustainable intervention and suggestions they have for future modifications of the tool. Two of the questions for the charge nurses regarding the viability of the ABA tool included opportunity to provide qualitative feedback, and one open-ended qualitative question requested suggestions for future use.

Finally, when the ABA tool was filled out each shift, charge nurses were asked to rate how influential the ABA tool was for creating that shift's assignments with a Likert-type scale ranging from 1-not at all to 5-extremely. This question was included at the bottom of the ABA tool and was collected with the tools as described above.

Ethical Considerations

This project was reviewed and approved by the implementation facility's Nursing Research Council (Appendix G), the facility's Institutional Review Board (IRB; Appendix H), and the university's IRB (Appendix I) prior to implementation. To protect the privacy of bedside and charge nurses, surveys were completed anonymously, and information was stored within REDCap, a secure web application designed specifically for research studies. This platform is approved and required by the implementation organization. There are no conflicts of interest to disclose. There were no outside sources of funding that supported this work.

Statistical Analysis

The pre-implementation survey collection garnered 18 total responses, all of which were complete records. The post-implementation survey collection resulted in 13 total responses, 12 of which were complete records. After comparing the anonymous coding, eight records were able to be correlated and compared during statistical analysis. Records not able to be matched were due to having no matching codes from pre- to post-implementation, or codes being entirely omitted from the records.

A Wilcoxon signed-rank test was conducted to evaluate the differences in pre- and post-intervention internal burnout, external burnout, job satisfaction, as well as the "bonus" questions. Descriptive statistics were used to interpret the demographics data, the non-paired questions from the post-implementation survey, and the data about how influential the ABA tool was in each shift's assignments. A Mann-Whitney U test was used to analyze the questions for the charge nurses regarding satisfaction with the assignment-making process, how much making assignments contributes to workload, and

how much making assignments causes stress. Tables containing data used in statistical analysis can be found in Appendix J.

Results

A majority of the participants were women, ages 30-39. While most participants have obtained a bachelor's degree, years of experience varied. Details regarding the demographic information of participants can be found in Appendix K.

No significant difference was found from pre- to post-intervention for internal burnout ($p = 1.0$), external burnout ($p = .4098$), or job satisfaction ($p = 1.0$). Additionally, there was no significant difference found for the "bonus" questions about development and equity of NPAs on the unit. Due to this finding, the "bonus" questions were not included in further statistical exploration of the dataset. Boxplots (Appendix L) for internal burnout, external burnout, and job satisfaction visually confirm these findings.

Based on the thresholds designated by Barton et al. (2022), a contingency table demonstrates the lack of change from pre-implementation to post-implementation for both internal and external burnout. For internal burnout, one respondent scored over the "burnout" threshold at both pre-intervention and post-intervention; seven respondents scored "no burnout" at both measurements. For external burnout, all 8 respondents measured below "burnout" threshold both pre- and post-intervention.

Five charge nurses participated in the pre-implementation survey and six in the post-implementation survey. See Appendix K for demographics specific to these charge nurses. Three questions to assess the viability of the ABA tool were included on the post-implementation survey for charge nurses. No statistically significant difference was found in the questions regarding satisfaction with assignment making ($p = 0.329$), how

making assignments contributes to workload ($p = 0.6623$), and how much making assignments contributes to stress ($p = 0.5368$).

The questions regarding sustainability, recommendation to another unit, and a final question seeking feedback for future improvement of the tool allowed free-text qualitative answers to be given. Regarding barriers to sustainability, the common theme amongst responses was the time required to complete the ABA tool. When asked why they would not recommend a similar tool to other units, one respondent stated the tool was specific to rehab, and another felt the tool would not increase nurse satisfaction with their workload. Recommendations for improvement included shortening the tool, making it easier to fill out, and allowing the bedside nurses to fill out the tool to reduce the workload on the charge nurses.

One hundred forty-nine ABA tools out of 168 possible shifts over the 12-week implementation period were collected, with 108 of the collected tools completed. When rating the ABA tool's influence on the shift's assignments, 14.8% answered "not at all," 16.1% answered "somewhat," 12.8% answered "moderately," 3.4% answered "very," 4.0% answered "extremely." The question was left blank on 49% of tools.

Discussion

The implementation of an ABA tool that captures unit-specific variables that contribute to nursing workload was implemented with the potential to positively impact burnout and satisfaction of nurses working in an inpatient rehabilitation unit. However, measures of the ABA tool intervention produced no statistically significant results. Based on the data analysis, it is also difficult to conclude clinical significance of the intervention.

Strengths of the project include the approach for development of the ABA tool. The tool utilized the powerful yet generalized WLA score generated by the EHR, combined with unit-specific variables identified by the charge nurses of the implementation unit, to capture the nuanced aspects contributing to nursing workload on the inpatient rehabilitation unit. The tool combined the innovation of technology with the invaluable clinical expertise of experienced nurses to create a standardized yet adaptable tool to identify and equitably distribute workload. In the age of technological advancements, it is critical to remember that sound nursing judgment is the most essential instrument in delivering exceptional patient care.

Interpretation

Based on the statistical analysis of the data, there are no causal or correlational relationships that can be attributed to the intervention. There are a variety of factors that may have contributed to this lack of significance. The small number of observations able to be paired pre- and post-intervention greatly limited the sample size of this project, making meaningful change difficult to measure. It is also possible that the 12-week implementation period was too short to observe measurable changes.

These results do not align with other recent literature, which showed promising results, specifically in the inpatient rehabilitation setting, when implementing an ABA tool of a similar format that inspired the intervention for this project. Riley et al. (2021) implemented the Rehab MATRIX and found a 35% ($p = 0.0013$) increase in median satisfaction scores.

There were a variety of external factors that may have affected the impact of this project. Near the beginning of the implementation period, the hospital in which the

implementation unit resides introduced a Patient Injury Prevention (PIP) initiative, in which units closely track and report data related to high-risk scenarios. Each shift, the charge nurses are responsible for identifying these high-risk conditions, such as indwelling urinary catheters, central lines, and patients at high risk for fall or skin breakdown. Many of these PIP data points correspond in some way with the variables on the ABA tool. Some charge nurses reported feeling that filling out both forms was redundant and created too much "paperwork" for their already busy shifts. Additionally, a trial of a new intermittent catheter supply was initiated on the unit the week prior to implementation, adding to the complexity of the daily work of the unit.

Unit culture may have also played a role in the lack of observable change. The general culture and attitude of the staff of the implementation unit was an area of concern in the time leading up to, during, and after the implementation period. Anecdotal feedback suggests widespread frustration and a general decline in morale. During the implementation period, the charge nurses from the implementation unit attended a "retreat" where these culture issues were discussed in hopes of developing an approach to transforming morale. The general spirit and mood of the unit may have impacted participation in the surveys and the feelings of the charge nurses towards utilizing the ABA tool. Despite the negative unit zeitgeist, only one participant from the paired data scored above the threshold for internal burnout, and none measured over threshold for external burnout. This lack of measured burnout indicates that the source of dissatisfaction and burnout among RNs may lie outside their patient care workload. Future structured assessment may help to systematically evaluate these perceptions and

their potential impact on the outcomes of this project and the overall productivity of the unit.

This intervention aimed to improve an existing process. It was designed to make the previous process more consistent and equitable without contributing burdensome workload. One question on the pre- and post-implementation surveys aimed to identify the intervention's impact on workload, but statistical analysis of this question did not reveal significant change, and there was no observable trend identified in the responses. Further assessment could be considered to study other variables impacting burnout and satisfaction at the local level.

Limitations

Limitations include lack of generalizability and survey bias. The variables used in the ABA tool are specific to inpatient rehabilitation, so the tool's impact in this setting cannot be translated to other settings. However, due to the potential for spread to other contexts, the tool could be adapted to the needs of a new implementation setting and evaluated for effectiveness. Despite privacy assurances, the survey results were self-reported and therefore may have been bias towards answers the participants feel were socially desirable.

Despite efforts to create an anonymous yet repeatable code so that pre- and post-implementation responses could be paired, discrepancies in coding resulted in only eight viable paired records. The resulting small sample size rendered significant change difficult to identify through statistical analysis. Efforts were made to minimize these limitations by frequent email reminders during the survey periods to increase the total number of participants. The project manager attempted to connect face-to-face with all

nurses meeting inclusion criteria to encourage their participation, reiterate their privacy, and emphasize the importance of the code to improve the quality of the data.

Conclusions

Usefulness

Based on the lack of statistically significant change or other observable trends in the data, it is difficult to endorse the further use of this tool in its current form. The paired pre- and post-implementation surveys identified that only one respondent scored over the threshold for internal burnout, and none scored over the threshold for external burnout, yet the tenacious, though undefined, problems with morale still exist. This suggests that the dissatisfaction and burnout among nurses may have a source outside of the direct work they perform and the workload they experience. Further examination to quantify staff morale and investigate its source may be prudent, though it is outside the scope of this project.

Sustainability

The tool remains available on the unit for those who benefit from its use. There are no substantial ongoing costs to the facility. Printing supplies required for any future use of ABA tool will be provided by the stakeholder. No other costs have been identified. Participants were not financially incentivized to participate. The tool was designed for sustainability, and the qualitative feedback has been provided to the unit manager for consideration as the unit navigates next steps in addressing burnout and satisfaction.

Potential for Spread to Other Contexts

This intervention has high potential for spread to other contexts. Because the WLA score is an enterprise-wide function, the other variables in the ABA tool can be

adjusted for aspects of care unique to other patient populations and care settings. It is possible that a different setting with different cultural context may be more receptive to the adoption of an ABA tool with variables specific to that setting.

Implications for Practice

Though this intervention in its current state may not be the ideal solution, this project identifies the need to address the source and implications of burnout and dissatisfaction in nursing. Though staffing challenges and workload have been identified as contributors to these issues nationwide, the findings of this project suggest that there may be another source of burnout and dissatisfaction at the local level. Regardless of the source, the nation will continue to see staffing challenges and increasingly complex patient populations (American Association of Colleges of Nursing, 2022). It is in the best interest of the nursing profession to continue to explore methods to accommodate these challenges, support nurses, and facilitate quality patient care.

Additionally, it could be prudent to evaluate patient-focused and financial outcomes of this intervention. The review of literature suggests creating equitable patient assignments may decrease adverse patient outcomes such as healthcare-associated infections. Improving patient outcomes and nurse satisfaction and burnout may also have cost-containment benefits as well.

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Appendix A: Acuity-Based Assignment Tool

Date: _____ Shift: Day / Noc

Variable ***All worth 1 pt unless otherwise specified***	4300	4301	4302	4303	4304	4305	4306	4307	4308	4309	4310	4311	4312	4313	4314	4315	4316	4317	4318	4319	4320
WLA scores *Green- 1, Yellow-2, Red-3*																					
TID or QID blood sugars *Sugars and sliding scale-1, carb count-2*																					
Conferences *Conference for days, note for nights*																					
Discharges/fresh admits *Discharges for day, fresh admits for noc*																					
Behaviors *Impulsive, confusion, delirium*																					
Communication barriers *Aphasia, non-verbal*																					
Complicated med pass *Tubes, crushed pills, one-by-one*																					
Feeding assist *Tube feeds, water boluses, staff feeding*																					
Activity assist *Up with 2 or CL*																					
Incontinent/toileting schedule *Bladder or bowel*																					
Bowel program *Include for affected shift(s)*																					
Intermit cathing/bladder monitoring *Bladder scans outside of 3 admit PVRs*																					
Total																					

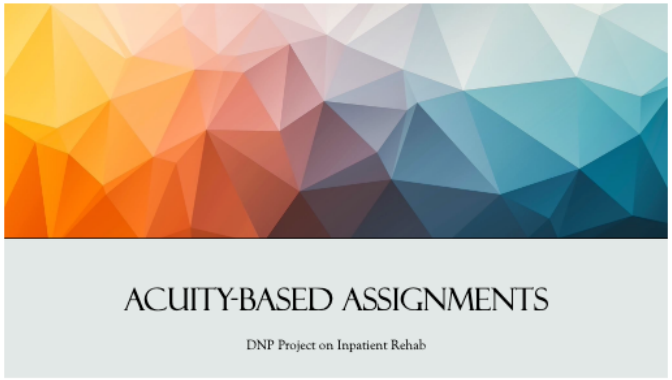
Low: 1-5
Moderate: 6-10
High: 11+

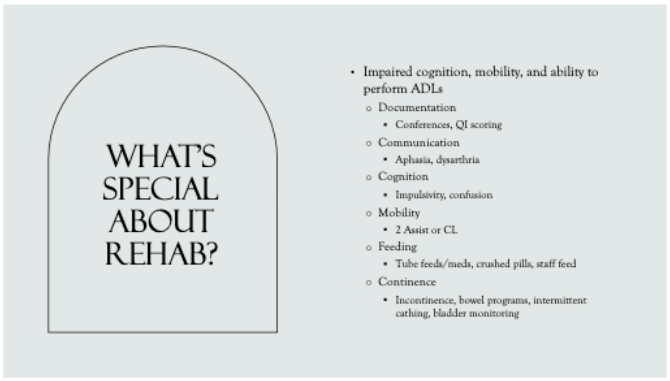
Other Considerations
Continuity, float vs rehab staff, interpreter, personalities/preferences, cytotoxic precautions, etc.)

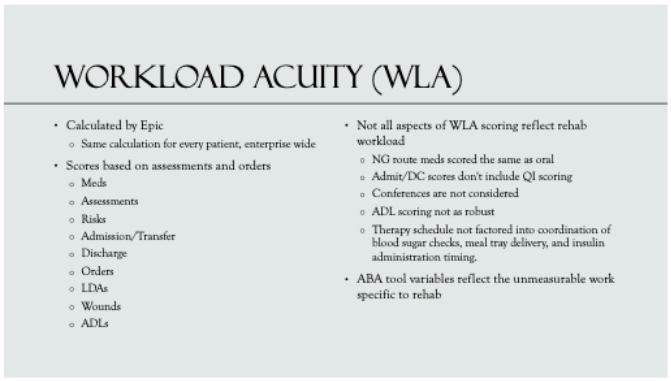
How influential was the ABA tool for this shift's assignments?

1-not at all 2-somewhat 3-moderately 4- very 5-extremely

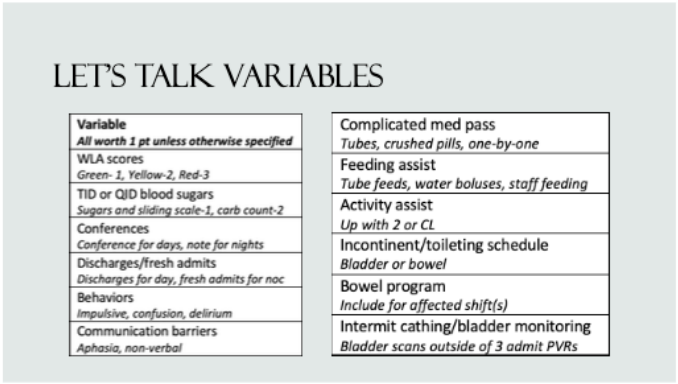
Appendix B: Charge RN Education PowerPoint

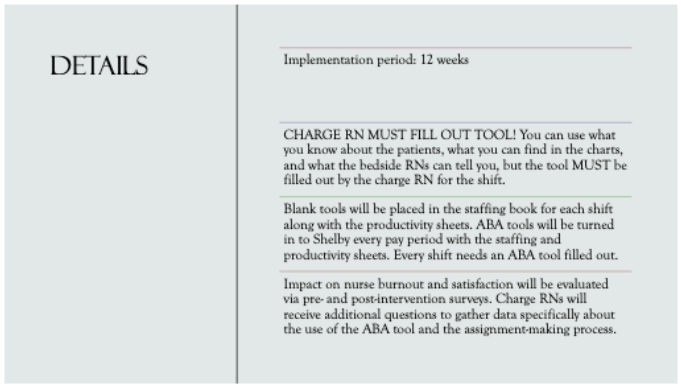







ABA TOOL
12 variables
15 points possible
Other considerations don't directly reflect workload, but should be considered when pairing nurses to patients
Date: _____ Shift: Day / Noc
Variable
All worth 1 pt unless otherwise specified
WLA scores
Green- 1, Yellow-2, Red-3
TID or QID blood sugars
Sugars and sliding scale-1, carb count-2
Conferences
Conference for days, note for nights
Discharges/fresh admits
Discharges for day, fresh admits for noc
Behaviors
Impulsive, confusion, delirium
Communication barriers
Aphasia, non-verbal
Complicated med pass
Tubes, crushed pills, one-by-one
Feeding assist
Tube feeds, water boluses, staff feeding
Activity assist
Up with 2 or CL
Incontinent/toileting schedule
Bladder or bowel
Bowel program
Include for affected shift(s)
Intermit cathing/bladder monitoring
Bladder scans outside of 3 admit PVRs
Total
Low: 1-5
Moderate: 6-10
High: 11+
Other Considerations
Continuity, float vs rehab staff, interpreter, personalities/preferences, cytotoxic precautions, etc.)
How influential was the ABA tool for this shift's assignments?
1-not at all 2-somewhat 3-moderately 4- very 5-extremely


LET'S TALK VARIABLES
Variable
All worth 1 pt unless otherwise specified
WLA scores
Green- 1, Yellow-2, Red-3
TID or QID blood sugars
Sugars and sliding scale-1, carb count-2
Conferences
Conference for days, note for nights
Discharges/fresh admits
Discharges for day, fresh admits for noc
Behaviors
Impulsive, confusion, delirium
Communication barriers
Aphasia, non-verbal
Complicated med pass
Tubes, crushed pills, one-by-one
Feeding assist
Tube feeds, water boluses, staff feeding
Activity assist
Up with 2 or CL
Incontinent/toileting schedule
Bladder or bowel
Bowel program
Include for affected shift(s)
Intermit cathing/bladder monitoring
Bladder scans outside of 3 admit PVRs


DETAILS
Implementation period: 12 weeks
CHARGE RN MUST FILL OUT TOOL! You can use what you know about the patients, what you can find in the charts, and what the bedside RNs can tell you, but the tool MUST be filled out by the charge RN for the shift.
Blank tools will be placed in the staffing book for each shift along with the productivity sheets. ABA tools will be turned in to Shelby every pay period with the staffing and productivity sheets. Every shift needs an ABA tool filled out.
Impact on nurse burnout and satisfaction will be evaluated via pre- and post-intervention surveys. Charge RNs will receive additional questions to gather data specifically about the use of the ABA tool and the assignment-making process.


QUESTIONS?

Appendix C: Abbreviated Copenhagen Burnout Inventory[1]

TABLE 7 Abbreviated Copenhagen Burnout Inventory (CBI) items

1.	How often do you feel tired?[a]
2.	How often are you physically exhausted?[a]
8.	Do you feel burned out because of your work?[b]
10.	Do you feel worn out at the end of the working day?[a]
14.	Do you find it hard to work with patients?[b]
15.	Do you find it frustrating to work with patients?[b]

Note: Internal factor is determined from items 1, 2, 8, and 10. External factor is determined from items 14 and 15.
[a]5-point rating scale: never/almost never, seldom, sometimes, often, always.
[b]5-point rating scale: to a very low degree, to a low degree, somewhat, to a high degree, to a very high degree.

[1] Cropped from "Reliability and validity support for an abbreviated Copenhagen Burnout Inventory using exploratory and confirmatory factor analysis," by Barton et al., 2022, *Journal of the American College of Emergency Physicians, 3(4)*. CC BY-NC-ND 4.0.

Appendix D: Nurse Satisfaction with the Quality of Care Scale[2]

Items	
1-	The type of care you can provide to patients in this unit/clinic.
2-	The amount of time you can spend with patients in this unit/clinic.
3-	The level of staffing that is available for patient care in this unit/clinic.
4-	The availability of other resources needed for patient care in this unit/clinic.
5-	The overall quality of care patients receive in this unit/clinic.

[2] Cropped from "A psychometric analysis of the Nurse Satisfaction with the Quality of Care Scale." by Alilyyani et al., 2022, *Healthcare, 10*(6). CC BY 4.0.

Appendix E: Pre-implementation Survey

1. This survey is part of a South Dakota State University DNP project, led by Madelyn Smith, to evaluate the impact of Acuity-Based Assignments on nursing burnout and job satisfaction. This survey will be used to collect pre-implementation data and will be compared to post-implementation survey data. Participating in this survey is entirely voluntary. Your responses will remain anonymous. Answering "yes" to this question serves as your consent for participation in this pre-implementation survey. Do you wish to proceed?

   Yes, I give consent and wish to proceed with this survey
   No, I do not wish to proceed with this survey (selecting this option terminates survey)

2. Please create a code using the first 4 letters of your mother's maiden name followed by number of your birth month. For example, if your mother's maiden name is Johnson and your birthday is in June, your code would be "john06". This will allow pre- and post-implementation surveys to be paired for analysis while maintaining privacy for participants. You will enter this code again when completing the post-implementation survey.

   _____

3. What is your age?

   20-24 25-29 30-39 40-49 50-59 60-69

4. What is your gender identity?

   Female Male Other Prefer not to answer

5. What is your highest level of education?

   Diploma Associates Bachelors Masters Doctorate

6. How long have you been a nurse?

   0-5 years 6-10 years 11-15 years 16-20 years 21+ years

7. How often do you feel tired?

   Never/almost never Seldom Sometimes Often Always

8. How often are you physically exhausted?

   Never/almost never Seldom Sometimes Often Always

9. Do you feel burnt out because of your work?

To a very low degree To a low degree Somewhat To a high degree To a very high degree

10. Do you feel worn out at the end of the working day?

Never/almost never Seldom Sometimes Often Always

11. Do you find it hard to work with patients?

To a very low degree To a low degree Somewhat To a high degree To a very high degree

12. Do you find it frustrating to work with patients?

To a very low degree To a low degree Somewhat To a high degree To a very high degree

13. How satisfied are you with the type of care you can provide to patients on this unit?

Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

14. How satisfied are you with the amount of time you can spend with patients on this unit?

Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

15. How satisfied are you with the level of staffing that is available for patient care on this unit?

Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

16. How satisfied are you with the availability of other resources needed for patient care on this unit?

Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

17. How satisfied are you with the overall quality of care patients receive on this unit?

Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

18. To what degree do you feel assignments are created equitably?

To a very low degree To a low degree Somewhat To a high degree To a very high degree

19. To what degree do you feel assignments vary based on the previous shift's charge nurse?

To a very low degree To a low degree Somewhat To a high degree To a very high degree

20. Are you a charge nurse/Clinical Care Leader on Rehab?

Yes (selecting this option triggers further questions for charge nurses)
No (selecting this option ends the survey and triggers a thank-you page)

Additional pre-implementation questions for charge nurses:

21. How long have you been a charge nurse on Rehab?

    0-3 years 4-6 years 7-10 years 11-15 years 16-20 years 21+ years

22. To what degree are you satisfied with the current assignment-making process?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

23. To what degree does making assignments contribute to the workload of your shift?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

24. How often does the assignment-making process cause you stress?

    Never/almost never Seldom Sometimes Often Always

Appendix F: Post-Implementation Survey

1. This survey is part of a South Dakota State University DNP project, led by Madelyn Smith, to evaluate the impact of Acuity-Based Assignments on nursing burnout and job satisfaction. This survey will be used to collect post-implementation data and will be compared to pre-implementation survey data. Participating in this survey is entirely voluntary. Your responses will remain anonymous. Answering "yes" to this question serves as your consent for participation in this post-implementation survey. Do you wish to proceed?

   Yes, I give consent and wish to proceed with this survey
   No, I do not wish to proceed with this survey (selecting this option terminates survey)

2. Please create a code using your middle initial and the last four digits of your cellphone number (S2122). This will allow pre- and post-implementation surveys to be paired for analysis while maintaining privacy for participants. This is the same code you used on the pre-implementation survey.

   _____

3. What is your age?

   20-24 25-29 30-39 40-49 50-59 60-69

4. What is your gender identity?

   Female Male Other Prefer not to answer

5. What is your highest level of education?

   Diploma Associates Bachelors Masters Doctorate

6. How long have you been a nurse?

   0-5 years 6-10 years 11-15 years 16-20 years 21+ years

7. How often do you feel tired?

   Never/almost never Seldom Sometimes Often Always

8. How often are you physically exhausted?

   Never/almost never Seldom Sometimes Often Always

9. Do you feel burnt out because of your work?

   To a very low degree To a low degree Somewhat To a high degree To a very high degree

10. Do you feel worn out at the end of the working day?

    Never/almost never Seldom Sometimes Often Always

11. Do you find it hard to work with patients?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

12. Do you find it frustrating to work with patients?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

13. How satisfied are you with the type of care you can provide to patients on this unit?

    Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

14. How satisfied are you with the amount of time you can spend with patients on this unit?

    Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

15. How satisfied are you with the level of staffing that is available for patient care on this unit?

    Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

16. How satisfied are you with the availability of other resources needed for patient care on this unit?

    Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

17. How satisfied are you with the overall quality of care patients receive on this unit?

    Very dissatisfied Dissatisfied Neutral Satisfied Very satisfied

18. To what degree do you feel assignments are created equitably?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

19. To what degree do you feel assignments vary based on the previous shift's charge nurse?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

20. Are you a charge nurse/Clinical Care Leader on Rehab?

    Yes (selecting this option triggers further questions for charge nurses)
    No (selecting this option ends the survey and triggers a thank-you page)

Additional post-implementation questions for charge nurses:

21. How long have you been a charge nurse on Rehab?

    0-3 years 4-6 years 7-10 years 11-15 years 16-20 years 21+ years

22. To what degree are you satisfied with the piloted assignment-making process?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

23. To what degree does making assignments contribute to the workload of your shift?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

24. How often does the assignment-making process cause you stress?

    Never/almost never Seldom Sometimes Often Always

25. To what degree did the ABA tool improve the assignment-making process for you?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

26. To what degree would you say using the ABA tool is a sustainable process?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

27. To what degree would you recommend the use of this type of tool to other units?

    To a very low degree To a low degree Somewhat To a high degree To a very high degree

28. How would you recommend improving this tool for future use?

    _____

Appendix G: Facility Nursing Research Council Approval

Hi, Madelyn,
You did a great job with your presentation. Your project was approved to move forward to IRB. I will also send the letter of agreement on to [redacted] for signature.
You can proceed with the Academic Information and Data Security Form. You will also need to complete a 503 C application attached here. Please let me know if you have questions as you complete these forms.
Complete the 503 C form and return it to me. I will notify you of next steps by email.
Again, please let me know if you need help with this. I am very happy to help.

We would like to have you present the project results when your project is completed. I know school is busy and so this can be done after you complete your course work. If you give me a timeframe when you think you will be completed, I will make a note to follow up with you and get you on the schedule.

Sincerely,
[redacted]

[redacted]

Appendix H: Facility Institutional Review Board Approval

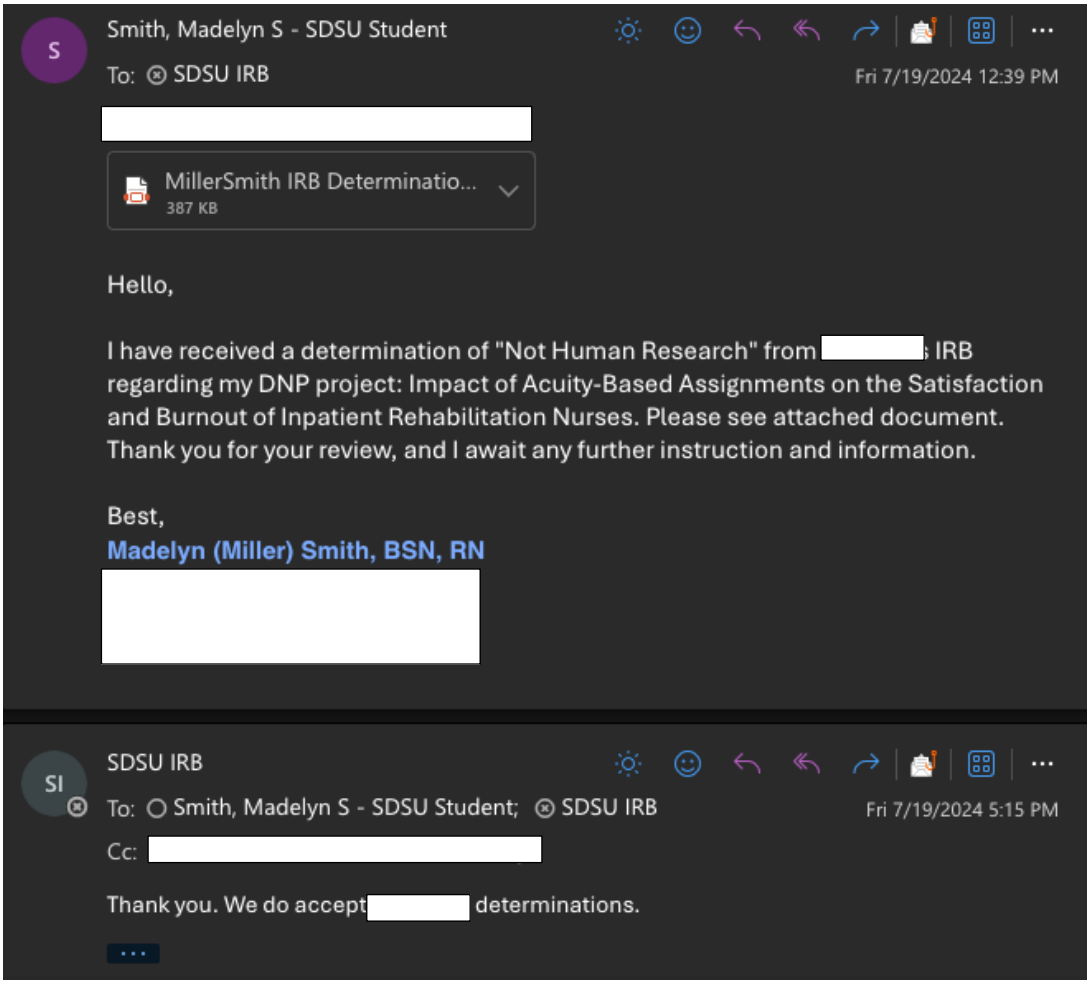
The IRB reviewed the following submission:

Type of Review:	Initial Study via Non-Committee Review
Title of Study:	Acuity-Based Assignments: Impact of Acuity-Based Assignments on the Satisfaction and Burnout of Inpatient Rehabilitation Nurses
Investigator:	[redacted]
IRB ID:	**STUDY00003645**
Special Determinations:	None

The IRB determined, on 7/17/2024, that the proposed activity is not human research.
[ ] IRB review and approval is not required.

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are being considered and there are questions about whether IRB review is needed, please submit a study modification to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

Appendix I: South Dakota State University Institutional Review Board Approval



Appendix J: Data for Statistical Analysis

Table J1

Data for All RN Questions

	Pre-intervention Median	Post-intervention Median	Pre-Intervention IQR	Post-Intervention IQR	P-value
Internal Burnout	13	13	1.25	1.5	1
External Burnout	4	4	1	0.75	0.4095
Satisfaction	14	15.5	2.5	5.25	1

Table J2

Data for Charge RN Questions

	Pre-intervention Median	Post-intervention Median	Pre-Intervention IQR	Post-Intervention IQR	P-value
Satisfaction	3	3.5	0	1	0.329
Workload	3	3	1	1.5	0.6623
Stress	4	3	0	2	0.5368

Appendix K: Demographics Data

Table K1

Demographics for All Pre- and Post-Implementation Surveys and Paired Data

	All Pre-Implementation n (%)	All Post-Implementation n (%)	Paired n (%)
Age			
20-24	3 (16.7)	2 (15.4)	1 (12.5)
25-29	1 (5.6)	2 (15.4)	1 (12.5)
30-39	5 (27.8)	3 (23.1)	2 (25)
40-49	3 (16.7)	2 (15.4)	1 (12.5)
50-59	2 (11.1)	1 (7.7)	1 (12.5)
60-69	4 (22.2)	3 (23.1)	2 (25)
Gender Identity			
Woman	11 (61.1)	9 (69.2)	6 (75)
Man	7 (38.9)	4 (30.8)	2 (25)
Other/Prefer not to answer	0 (0)	0 (0)	0 (0)
Highest Level of Education			
Associate's	3 (16.7)	1 (7.7)	1 (12.5)
Bachelor's	15 (83.3)	12 (92.3)	7 (87.5)
RN Experience			
0-5	5 (27.8)	5 (38.5)	2 (25)
6-10	5 (27.8)	1 (7.7)	1 (12.5)
11-15	3 (16.7)	4 (30.8)	2 (25)
16-20	0 (0)	0 (0)	0 (0)
21+	5 (27.8)	3 (23.1)	3 (37.5)
Charge RN Experience			
0-3	1 (20)	2 (33.3)	1 (33.3)
4-6	0 (0)	1 (16.7)	0 (0)
7-10	1 (20)	2 (33.3)	1 (33.3)
11-15	3 (60)	1 (16.7)	1 (33.3)

Note. This table contains demographics from all 18 pre-implementation surveys and all 13 post-implementation surveys, as well as demographic information for the paired data. The Charge RN Experience section contains data from all pre- or post-implementation in which participants indicated they are a charge RN, and the years of experience for the charge RNs from the paired data.

Appendix L: Boxplots for Internal Burnout, External Burnout, and Satisfaction