Nurse clinical ladder participation and effect on burnout, work satisfaction, and patient outcomes: A cross-sectional descriptive study

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Abstract

The nurse clinical ladder program (CLP-RN) can increase nurse work satisfaction, reduce work-related burnout and attrition rates, and improve patient outcomes by increasing patient safety metric scores. This study aims to explore whether registered nurses (RNs) participating in the CLP-RN have higher levels of work satisfaction, lower levels of work-related burnout, and higher patient safety metric scores, including medication scanning rates and interoperability scores, than RNs who choose not to participate in the CLP-RN. A cross-sectional descriptive quantitative design with structured, reliable, and validated questionnaires was used. Purposive sampling was employed, and 190 RNs completed the questionnaires. The results showed that RNs who participated in the CLP-RN had higher patient safety metric scores, higher levels of work satisfaction, and lower levels of burnout. This study emphasizes the importance of senior nursing leadership encouraging RNs to engage and participate in the CLP-RN to improve patient safety outcomes.

Background

Burnout in nursing is a well-researched and documented problem and affects work satisfaction, patient outcomes, and nurse retention rates (Dall'Ora et al., 2020; Kelly et al., 2021). Burnout is a syndrome of combined emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach & Jackson, 1981). Emotional exhaustion is the inability to give to others because of depleted emotional reserves. In depersonalization, one becomes unfeeling towards others. The reduced personal accomplishment is dissatisfaction with workplace competence and achievements.

Nationally, the hospital employee turnover rate stands at 20.7%, and RN turnover is estimated at 18.4%, with an average hospital RN vacancy rate of 9.9%. The average cost of turnover for a bedside RN is $56,300, resulting in the average hospital losing between $3.9 million and $5.8 million per year. Each 1% increase in RN turnover will cost the average hospital an additional $262,500 per year to recruit, hire, orient and train new nurses, and additional resource allocation for overtime, retention strategies, and external agency hires (NSI Nursing Solutions Inc, 2024). Furthermore, high RN vacancy rates lead to higher patient falls, more occurrences of medication errors and decrease patient and nurse satisfaction (Bae, 2022; Bae et al., 2010).

Medication errors result in an estimated 1.5 million adverse drug events in the U.S. annually. On average, hospitalized patients are exposed to at least one medication error daily. Those mistakes contribute to an estimated 7,000 deaths each year (Committee on Quality of Health Care in America & Medicine, 2000). Barcode medication scanning in hospital settings assists in the overall reduction of medication errors, particularly dosage errors, incorrect drug, wrong patient, unauthorized drug, and medication route errors (Hutton et al., 2017; Institute for Safe Medication Practices [ISMP], 2024). Scanning both patient and medication barcodes in 95% of bedside medication administrations is widely considered best practice for reducing medication errors (Austin et al., 2022; Saleem, 2023; The Leapfrog Group, 2018).

Smart infusion pump utilization of intravenous medications effectively prevents potentially serious medication errors (Alamer & Alanazi, 2023). Additionally, interoperability between medication administration records (MARs), smart pumps, and customizable drug libraries significantly reduces intravenous medication administration frequency and severity of infusion errors (Skog et al., 2021; VanHorn et al., 2024).

A literature review supports the development and implementation of a CLP-RN to increase work satisfaction, reduce work-related burnout, and improve nursing retention (Ahn & Choi, 2022; Mijares & Radovich, 2020). CLP-RN participation also contributes to a culture of safety, leading to improved patient outcomes, and recognizes nurses for their workplace engagement, experience, knowledge attainment, and professional development aspirations (Leamon et al., 2023). CLP-RN's theoretical framework is based on Patricia Benner's philosophical foundation of knowledge progression, development of skills, and professional growth, introduced in "From Novice to Expert"(Benner, 1982).

Mercy Hospital in Durango, Colorado, struggles with meeting patient safety metric benchmarks, including interoperability between the MAR and pumps, medication scanning rates, and nurse retention. An exhaustive review of the literature widely concludes that scanned and linked medications before administration lead to better patient outcomes and decreased medication errors. Also, nurse satisfaction and retention is positively correlated to better patient outcomes (Slagle et al., 2023; White et al., 2019).

Strengths, weaknesses, opportunities, and threats analysis

Strengths, weaknesses, opportunities, and threats analysis (SWOT) are as follows. Strengths of the hospital to meet these patient safety goals include a strong nurse leadership team, a robust and evidence-based CLP-RN, a reliable electronic health record (EHR), nurse loyalty to the small community, and advanced reporting systems.

Weaknesses include nurse staffing shortages, outdated medication pumps, broken equipment, supply shortages, budget concerns, nursing attrition, a weak orientation process, a subpar new graduate nurse residency program, and disengaged and stressed nurses.

Opportunities include the recent CommonSpirit merger and allocation of knowledge, financial resources, standardization, more precise expectations of organizational goals, lack of competition to attract talent away from the hospital, and potential for improved nurse orientation, nurse residency program, and mentorship process.

Threats include brand dissatisfaction, corporate changes to employee benefits and workflows that may drive nurses away, the potential for less competitive wages, and organizational shifts towards tighter budget requirements and resource allocation.

Purpose

Little is known about the effect of participation in a CLP-RN on perceived levels of nurse burnout and work satisfaction and effects on measurable patient safety outcomes.

Do RNs who participate in the 2024 CLP-RN have higher levels of work satisfaction, lower rates of work-related burnout, and better patient safety metric scores than those who do not participate in the CLP-RN at Mercy Hospital in Durango, Colorado? A cross-sectional descriptive quantitative design reviewed rates of work satisfaction and burnout, measured with Likert scales, the Minnesota Satisfaction Questionnaire (Vocational Psychology Research [VPR], 1977), and the Maslach Burnout Inventory (Maslach & Jackson, 1981), and compared interoperability and medication scanning rates.

The associated research question was: does nurse CLP-RN participation affect burnout, work satisfaction, and patient outcomes? The secondary outcome measure analyzed CLP-RN participation and nurse retention rates.

Methods

The location of this study is an eighty-two-bed rural hospital, including inpatient acute and critical units and the emergency department (ED), in Durango, Colorado.

Pre-intervention data was collected in December 2023, and post-intervention data was collected in December 2024. CLP-RN implementation began in January 2024 and ended in December 2024. Data points were collected at three-month intervals of dependent variables of interoperability and medication scanning rates, to determine trends in measurable patient outcomes.

Participants

RNs who practice direct patient care at least 50% of the time in acute, critical, and emergency care units and who participate in the CLP-RN, compared to similar RNs who do not participate in the CLP-RN, were evaluated on burnout, work satisfaction, retention, and medication scanning rates and interoperability scores. Part-time nurses (24 or more hours per week) and full-time nurses (32 or more hours per week) were allowed to participate. All RNs in direct patient care areas were asked to voluntarily and anonymously complete the Maslach Burnout Inventory-Health Services Survey (MBI-HSS) and the Minnesota Satisfaction Questionnaire (MSQ) during required 1:1 scheduled monthly meetings with the Director of Nursing to evaluate burnout and work satisfaction, pre- and post-CLP-RN participation. Surveys were collected anonymously by the primary researcher and categorized by CLP-RN participation. Hospital-wide, direct patient care RN medication scanning rates and interoperability scores were analyzed and documented monthly and pre-and post-CLP-RN, independent of CLP-RN participation.

Study Size

A purposive, homogeneous sampling method was used, and the sampling size was determined using G*Power 3.1.9.2 software (Faul et al., 2007). A sample size of 88 for each group was determined to be sufficient with an effect size $d = 0.5$, α error probability of 0.05, and

a power of 0.95 (Table 1). This study sought to recruit at least 90 RNs who participate in the CLP-RN and 90 RNs who do not participate in the CLP-RN, to analyze and compare burnout and job satisfaction via voluntary questionnaires.

Demographics

Data on the mean age of nurses, educational level, years of nursing experience, years working at Mercy Hospital, day or night shift, full-time or part-time, and primary nursing unit worked was collected.

Variables

The independent variable was the CLP-RN and the dependent variables were nurse burnout, work satisfaction, interoperability scores, medication scanning rates.

Data sources/measurement

EHR interoperability rates and medication scanning rates for hospital-wide direct patient care RNs were collected. The MBI-HSS (Maslach & Jackson, 1981) measured nurse burnout (Figure 1). The MBI-HSS is composed of 22, 7-point Likert scale items, ranging from 0 (never) to 6 (every day), an ordinal level of measurement, and takes between 10-15 minutes to administer (Maslach et al., 2018). The instrument uses three subscales: Personal Accomplishment (PA), Emotional Exhaustion (EE), and Depersonalization (DP). Theoretical foundations of the MBI-HSS are based on the tri-factor model of burnout comprising exhaustion, cynicism, and ineffectiveness (Dall'Ora et al., 2020). Table 2 depicts the MBI-HSS scoring guide and shows that higher scores in EE and DP correspond to a higher degree of burnout, but a high score in PA corresponds to a lower degree of burnout. The MBI-HSS meets the criteria for reliability using Cronbach's α to measure internal reliability. Cronbach's α of 0.7-0.9 is considered internally consistent and indicates a correlation between item scores (Portney, 2020).

Cronbach's α were as follows: EE = 0.855, DP = 0.823, and PA = 0.667 (Bassam et al., 2023). Cronbach's α for three dimensions was greater than 0.7 and showed good internal reliability in two other studies (Forné & Yuguero, 2022; Moalemi et al., 2018). In another study, the internal consistencies of the three factors in a modified three-factor model were satisfactory, as Cronbach's α met the criterion of 0.70, with levels at 0.87 for EE, 0.83 for DP and 0.81 for PA (Kanste et al., 2006). These results are consistent with the findings of previous studies reviewing the MBI-HSS in nursing and other healthcare-related occupations (Kanste et al., 2006).

The results of the test-retest reliability assessment in one study demonstrated the robust reproducibility and excellent reliability of the MBI-HSS: EE, intraclass correlation coefficients (ICC) = 0.927, p-value < 0.0001; PA, ICC = 0.963, p-value < 0.0001; DP, ICC = 0.764, p-value < 0.0001 (Bassam et al., 2023; Koo & Li, 2016). The test-retest reliability coefficients for the subscales were 0.82 (frequency) and 0.53 (intensity) for EE, 0.80 (frequency) and 0.68 (intensity) for PA, 0.60 (frequency) and 0.69 (intensity) for DP. All coefficients are significant beyond the 0.001 *p*-value and indicate good reliability (Koo & Li, 2016; Maslach & Jackson, 1981). Due to the historical application, research, and reputation of the MBI-HSS, face validity does not need discussion or measurement for the purpose of this study.

The MSQ (Vocational Psychology Research [VPR], 1977) was used to measure work-related satisfaction in this study (Figure 2). The MSQ is a 5-point Likert scale rated between 1 and 5 points (1 = Dissatisfied, 2 = Somewhat satisfied, 3 = Neutral, 4 = Satisfied, and 5 = Very satisfied"). MSQ is composed of 20 items and three subscales (general satisfaction, intrinsic satisfaction, and extrinsic satisfaction) and is used to measure job satisfaction. A score reflecting neutral satisfaction is 3 on a Likert scale of 1–5. If the score is lower than 3, job satisfaction is scored as low; and as high if greater than 3. The highest score is 100, and the lowest is 20. Scores

closer to 20 indicate that the satisfaction level is low, whereas scores closer to 100 indicate that the satisfaction level is high (Lakatamitou et al., 2020). Coefficient alpha values for the 20-item MSQ ranged from 0.85 to 0.92 in previous studies (Kiliç Barmanpek et al., 2022). The MSQ meets the criteria for reliability using Cronbach's α to measure internal reliability. A recent reliability and validity study determined Cronbach's α coefficient as 0.77 (Kiliç Barmanpek et al., 2022). Internal reliability is 0.96 in previous studies (Buitendach & Rothmann, 2009). The MSQ is a validated and reliable tool for measuring job satisfaction. MSQ face validity does not need discussion due to historical application.

Bias

Observer bias is minimized by utilizing two validated surveys, MBI-HSS and MSQ, to collect data on burnout and work satisfaction. Patient outcome data is collected from the EHR per each RN included in this study, compared to all RNs in direct patient care areas.

Selection bias is minimized by burnout and work satisfaction survey questionnaires embedded in required monthly 1:1 check-ins with the Director of Nursing, anonymously collected. However, RNs more engaged with the CLP-RN may have higher rates of participation than those who do not participate or nurses who complete the CLP-RN for other reasons than a sense of achievement, professional advancement, and work satisfaction, such as compensation and potential for paid non-clinical hours.

Allocation bias is a weakness of this study because RNs who participate in CLP-RN may have a stronger desire to provide safe patient care, lower levels of burnout, and higher levels of work satisfaction, whether they participate in CLP-RN or not (Moore et al., 2019).

Recall and Information bias is a weakness of this study as RNs who complete the MBI-HSS and MSQ may answer differently and subjectively due to their knowledge of this study's purpose.

Non-response bias is minimized by burnout and work satisfaction surveys embedded in monthly required 1:1 check-ins with the Director of Nursing, anonymously collected. However, survey completion was voluntary.

Quantitative variables

Participant groupings were RNs who participate in CLP-RN and RNs who do not participate in CLP-RN. Higher interoperability scores equate to safer patient care. The hospital and national benchmark is 90% (Alamer & Alanazi, 2023). Higher medication scanning rates equate to safer patient care. The hospital and national benchmark is 95% (Austin et al., 2022). MBI-HSS: higher scores in EE and DP correspond to a higher degree of burnout, but a high score in PA corresponds to a lower degree of burnout. MSQ: the highest score is 100, and the lowest is 20. Scores closer to 20 indicate that the satisfaction level is low, whereas scores closer to 100 indicate that the satisfaction level is high. Retention rates were analyzed after completion of the study between participating and non-participating RNs in the CLP-RN.

Statistical methods

For this cross-sectional study, two groups were asked about their level of burnout on a Likert scale, their work satisfaction levels on a Likert scale, and their patient safety metric scores were evaluated as a percentage computed by the EHR. The input variable is whether they are participating in the CLP-RN or not, which is a nominal level of measurement. The outcome variables are multiple-point ordinal scales. Each RNs subjective views of their levels of burnout

and work satisfaction are independent of each other, which is independent data. A χ^2 or Mann-Whitney U test was used as a statistical method for hypothesis testing.

The data were statistically analyzed using IBM SPSS Version 29.0.2.0 for Windows. The Student's t-test was used for the comparison of burnout scores and job satisfaction levels to CLP-RN participation. Post-hoc analyses were accomplished by applying Bonferroni correction if needed.

The significance level was accepted as $p = 0.05$. Longitudinal correlations were analyzed for both groups at three-month intervals to determine trends in interoperability and medication scanning rates for quality improvement and unit-specific initiative purposes. A sensitivity analysis may assist in determining if socio-economic variables, patient demographics or other determinants influenced MBI-HSS and MSQ scores.

Discussion

The CLP-RN can increase nurse work satisfaction, reduce work-related burnout, and improve patient outcomes by increasing safety metric scores. This study emphasizes the importance of senior nursing leadership encouraging RNs to engage and participate in the CLP-RN to improve patient safety outcomes.

Limitations

One limitation of this study is the lack of heterogeneity. RNs who participate in CLP-RN may intrinsically be more motivated to perform well and may have higher levels of work satisfaction. Another limitation of the nature of this study is the lack of interment of causality. RNs who participated in the CLP-RN may have learned better techniques to increase interoperability, had exposure to mentorship and leadership guidance, and avoided performance

improvement plans regarding sub-optimal patient care due to the requirements of CLP-RN participation.

External validity threats include biases mentioned previously. The Hawthorne and testing effects could skew the results of the MBI-HSS and MSQ scores, pre-and post-survey. RNs in this rural hospital may not be a good representation of RNs in other geographical settings, including urban cities. The tenets and requirements of the studied CLP-RN may be varied enough, so replication of this study may not be possible.

Funding and Stakeholders

Funding was net neutral in this study. Participants were free to opt in or out of the study at any point and participants knew the purpose of the study before voluntarily and anonymously completing the MBI-HSS and MSQ. The IRB approval process was not necessary due to the lack of protection of human subject concerns.

Key stakeholders for the evaluation of the Mercy Hospital CLP-RN include hospitalized patients, Mercy Hospital RNs who enroll and complete the CLP-RN, CommonSpirit senior nursing leadership, who design the curriculum based on best practice, finance leadership who approve the CLP-RN by reviewing nurse retention cost savings and patient safety outcomes compared to financial costs of the program, Mercy Hospital nursing leadership and regional and local quality departments.

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were followed in this study to aid in ensuring a high-quality presentation of this cross-sectional study (Elm et al., 2007).

Interpretation

CLP-RNs can mitigate attrition in nursing, ease the nursing shortage, and improve patient outcomes by increasing work satisfaction and decreasing burnout. CLP-RN participation aligns with better patient safety metrics, including medication scanning rates and interoperability scores, which can improve patient outcomes and reduce medication errors and serious safety events. Meeting required benchmarking can also increase a sense of achievement and elevate the practice of both RNs and the hospital, potentially increasing patient care reimbursements.

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Table 1

Sample Size Calculations

Test family: t tests

Statistical test: Means: Difference between two independent means (two groups)

Type of power analysis: A priori: Compute required sample size – given α, power, and effect size

Input Parameters

Tail(s)	One
Effect size d	0.5
α err prob	0.05
Power (1–β err prob)	0.95
Allocation ratio N2/N1	1

Output Parameters

Noncentrality parameter δ	3.3166248
Critical t	1.6536580
Df	174
Sample size group 1	88
Sample size group 2	88
Total sample size	176
Actual power	0.9514254

Figure 1

MBI Human Services Survey

Review Copy: MBI Human Services Survey

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

How often 0-6	Statements:
1. _____	I feel emotionally drained from my work.
2. _____	I feel used up at the end of the workday.
3. _____	I feel fatigued when I get up in the morning and have to face another day on the job.
4. _____	I can easily understand how my recipients feel about things.
5. _____	I feel I treat some recipients as if they were impersonal objects.
6. _____	Working with people all day is really a strain for me.
7. _____	I deal very effectively with the problems of my recipients.
8. _____	I feel burned out from my work.
9. _____	I feel I'm positively influencing other people's lives through my work.
10. _____	I've become more callous toward people since I took this job.
11. _____	I worry that this job is hardening me emotionally.
12. _____	I feel very energetic.
13. _____	I feel frustrated by my job.
14. _____	I feel I'm working too hard on my job.
15. _____	I don't really care what happens to some recipients.
16. _____	Working with people directly puts too much stress on me.
17. _____	I can easily create a relaxed atmosphere with my recipients.
18. _____	I feel exhilarated after working closely with my recipients.
19. _____	I have accomplished many worthwhile things in this job.
20. _____	I feel like I'm at the end of my rope.
21. _____	In my work, I deal with emotional problems very calmly.
22. _____	I feel recipients blame me for some of their problems.

For Review Only

(Administrative use only)

EE Total score: _____ DP Total score: _____ PA Total score: _____

EE Average score:_____ DP Average score:_____ PA Average score:_____

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Table 2

MBI-HSS Scoring Guide

Burnout construct	**Cutoff score**		
Emotional Exhaustion (EE)	0–18	19–26	>27
9 items	Low	Moderate	High
Depersonalization (DP)	0–5	6–9	>10
5 items	Low	Moderate	High
Personal Accomplishment (PA)	0–33	34–39	>40
8 items	High	Moderate	Low

Figure 2

Minnesota Satisfaction Questionnaire

*Ask yourself: How **satisfied** am I with this aspect of my job?*

***Very Sat.** means I am very satisfied with this aspect of my job.*

***Sat.** means I am satisfied with this aspect of my job.*

***N** means I can't decide whether I am satisfied or not with this aspect of my job.*

***Dissat.** means I am dissatisfied with this aspect of my job.*

***Very Dissat.** means I am very dissatisfied with this aspect of my job.*

On my present job, this is how I feel about . . .	Very Dissat.	Dissat.	N	Sat.	Very Sat.
1. Being able to keep busy all the time	☐	☐	☐	☐	☐
2. The chance to work alone on the job	☐	☐	☐	☐	☐
3. The chance to do different things from time to time	☐	☐	☐	☐	☐
4. The chance to be "somebody" in the community	☐	☐	☐	☐	☐
5. The way my boss handles his/her workers	☐	☐	☐	☐	☐
6. The competence of my supervisor in making decisions	☐	☐	☐	☐	☐
7. Being able to do things that don't go against my conscience	☐	☐	☐	☐	☐
8. The way my job provides for steady employment	☐	☐	☐	☐	☐
9. The chance to do things for other people	☐	☐	☐	☐	☐
10. The chance to tell people what to do	☐	☐	☐	☐	☐
11. The chance to do something that makes use of my abilities	☐	☐	☐	☐	☐
12. The way company policies are put into practice	☐	☐	☐	☐	☐
13. My pay and the amount of work I do	☐	☐	☐	☐	☐
14. The chances for advancement on this job	☐	☐	☐	☐	☐
15. The freedom to use my own judgment	☐	☐	☐	☐	☐
16. The chance to try my own methods of doing the job	☐	☐	☐	☐	☐
17. The working conditions	☐	☐	☐	☐	☐
18. The way my co-workers get along with each other	☐	☐	☐	☐	☐
19. The praise I get for doing a good job	☐	☐	☐	☐	☐
20. The feeling of accomplishment I get from the job	☐	☐	☐	☐	☐
	Very Dissat.	Dissat.	N	Sat.	Very Sat.