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Empowering nurse leaders: leveraging financial management practices to foster sustainable healthcare – a mixed-methods study

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Abstract

Introduction Nurse leaders play a crucial role in balancing financial sustainability and high-quality patient care. Their financial management skills impact patient safety, care quality, and satisfaction. However, many nurse leaders lack formal training in financial management, making it challenging to navigate budget constraints while maintaining care standards.

Aim To assess nurse leaders' perceptions of their financial management practices and explore their relationship to patient care quality and outcomes.

Methods A convergent parallel mixed-methods approach was conducted with 87 nurse leaders in private hospitals across Egypt. Quantitative data ($n=87$) were collected using the validated Nurse Leaders' Financial Management Practices Assessment (NLFMP) tool, a 15-item instrument measuring budgeting, resource allocation, cost-effectiveness, decision-making, and its impact on patient care. The data were analyzed using SPSS. Concurrently, qualitative data from open-ended responses underwent thematic analysis. The results were then integrated to compare statistical trends with key themes, providing deeper insights into the financial decision-making challenges faced by nurse leaders.

Results Findings indicated moderate financial management proficiency among 70% of participants, with high scores in decision-making influence (mean = 4.10 ± 0.48) and cost-effectiveness (mean = 4.05 ± 0.45). Budgeting practices (mean = 3.90 ± 0.50) and resource allocation (mean = 3.85 ± 0.55) were rated slightly lower, highlighting areas for improvement. The majority (87.3%) of nurse leaders perceived a strong relationship between financial management and patient care outcomes. Regression analysis showed that age ($p=0.010$), educational attainment ($p=0.044$), and employment status ($p=0.009$) were significant predictors of financial management proficiency. Thematic analysis

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highlighted key challenges, including budget constraints, staffing shortages, and balancing cost-efficiency with care quality.

Conclusion Nurse leaders perceive a strong link between financial management and patient care outcomes, emphasizing the need for targeted financial training and greater involvement in decision-making. Enhancing financial literacy among nurse leaders could foster better alignment between cost-efficiency and quality care, ensuring sustainable healthcare delivery.

Clinical trial number Not applicable.

Keywords Nurse administration, Financial management, Budgeting, Health care quality, Leadership

Introduction

Globally, healthcare systems face immense pressure to expand services for growing populations while operating within fixed budgets [1]. Over the past few decades, the industry has shifted from a purely service-oriented model—where care was provided at all costs—to a more business-driven approach that requires strategic allocation of limited financial resources [2]. In today's increasingly complex healthcare environment, nurse leaders play a pivotal role in maintaining high-quality patient care while effectively managing financial resources. Their financial management practices are directly linked to healthcare outcomes, as they must strike a balance between cost efficiency and patient-centered care [3]. Rising healthcare expenses, driven by advancements in medical technology and increased staffing demands, continue to escalate at an alarming rate [4]. Now more than ever, effective financial management in healthcare is crucial—a need that was first underscored by the Healthcare Leadership Alliance (HLA) over a decade ago [2].

Financial sustainability refers to the ability of organizations, institutions, or economies to maintain financial health and meet their long-term commitments without jeopardizing future viability. Effective financial stewardship in nursing leadership is not only crucial for sustaining hospital operations but also for ensuring that care standards are met without compromising patient safety and satisfaction. Given the critical impact of financial management on care delivery, examining nurse leaders' perceptions of their financial competencies and their influence on patient outcomes has become a priority in healthcare research [5].

Nurse leaders have been recognized as playing an important role and are in need of enlarging their responsibilities from those regarding the care quality and staffing to those associated also with financial competencies. Nursing care has been reported as consuming approximately one third of the hospital budget, and head nurses in charge of the units are expected to control labor costs, to contribute to cost saving and ultimately, to the financial stability of the system [6]. Given that nurse leaders may function as a role model, shaping staff attitudes and behaviors and, ultimately, the care environment, they

have been called to be prepared for financial competencies [7].

Effective financial management within nursing involves decisions on resource allocation, staffing, and budgeting, which can directly affect the quality of care provided to patients. Nurse leaders are often responsible for making complex decisions regarding resource distribution in environments with limited budgets, all while ensuring that these decisions do not negatively impact care standards, so the ability of nurse leaders to manage financial resources effectively can significantly impact patient outcomes, including patient safety, quality of care, and overall satisfaction [8]. One key area of concern is how financial management practices influence staffing levels, which is a major determinant of care quality. Nurse staffing ratios are strongly correlated with patient outcomes, where inadequate staffing can lead to increased errors, longer patient stays, and higher mortality rates [9].

Nursing represents the largest clinical workforce in the global health system. The ability to drive change and shape a more sustainable yet effective healthcare system lies within its people [1]. Globally, while nurse leaders have played a certain role in health care, significant strategic potential has been noted in nurse leaders in the management of both fiscal and care quality [10, 11].

Nurse leaders, therefore, face the challenge of ensuring optimal staffing levels within the constraints of financial limitations. Their perceptions of how well they can balance these factors are critical to understanding how financial decisions are made and their impact on both the workforce and the quality of patient care [12]. In addition to the challenges of resource management, nurse leaders also face external pressures such as policy changes, regulatory requirements, and shifts in healthcare funding, which can complicate financial decision-making. These external factors often necessitate difficult trade-offs between cost-saving measures and maintaining high standards of care. Understanding how nurse leaders navigate these challenges is essential for developing strategies that support them in making financially responsible yet patient-centered decisions [13, 14].

Financial management training and education play a crucial role in enhancing nurse leaders' ability to make

informed financial decisions. Many nurse leaders lack formal financial training, which can impact their confidence in budgeting and resource allocation [11]. A strong understanding of healthcare costs equips nurse managers with valuable insights into the leadership and management challenges facing the healthcare sector. Therefore, it is essential to provide nurse managers with targeted training and education to strengthen their role in hospital financial management [12]. By identifying gaps in financial competencies, the findings can support the development of targeted training programs, equipping nurse leaders with the skills necessary for effective budgeting, resource allocation, and cost-effective decision-making. Strengthening financial literacy among nurse leaders can enhance hospital financial sustainability, improve staffing adequacy, and ultimately contribute to better patient outcomes [13].

Paarima et al. [15] found that nurse managers possessed a moderate level of financial management knowledge and skills, with management training being the only significant factor contributing to their financial competencies. Similarly, a study by Noh and Lim [16] in South Korea, which analyzed nursing productivity through financial statements, revealed that while nurses' financial ratios were generally weak, their productivity remained high. In contrast, Bai et al. [6] identified insufficient financial management skills among nurse managers in China. Additionally, Ofei et al. [17] reported that nurse managers at the unit level had limited financial awareness.

Egypt has a highly complicated healthcare system, with many public and private providers and financing agents. Health services in Egypt are currently managed, financed, and provided by agencies in the various sectors of the government under different laws. Health services are also provided by private providers of variable categories and at variable levels of intervention. This study was conducted in private hospitals across Egypt. Egyptian private hospitals face financial sustainability challenges due to rising operational costs and resource allocation constraints, making financial management a critical competency for nurse leaders.

This study aims to assess nurse leaders' perceptions of their financial management competencies and identify demographic and professional predictors of financial proficiency. Specifically, it seeks to answer the following research questions: (1) What are nurse leaders' perceptions of their financial management competencies? (2) What demographic and professional factors contribute to variations in financial management proficiency among nurse leaders?

Methods

Research design, sample, and sampling

This study utilized a convergent parallel mixed-methods approach, where quantitative and qualitative data were collected simultaneously and analyzed separately that used to assess nurse leaders' perceptions regarding their financial management practices and their relationship to patient care quality and outcomes. The design combined quantitative data collection through structured questionnaires and qualitative data collection via open-ended responses to provide a comprehensive understanding of the topic. The study involved 87 nurse leaders from various private hospitals across Egypt. The selection process utilized a multistage sampling approach. Initially, hospitals were randomly chosen from four major regions: Northern Egypt (10 hospitals), Upper Egypt (15 hospitals), Eastern Egypt (10 hospitals), and Western Egypt (7 hospitals). An additional 45 hospitals were selected from Cairo and the Delta region. Nurse leaders participating in the study were required to have a minimum of five years of nursing experience and hold at least a bachelor's degree in nursing or higher. In the second stage, nurse leaders were chosen through a non-probability convenience sampling method, targeting individuals in leadership positions such as Regional Nurse Managers (10), Chief Nursing Officers (6), and Nurse Managers (60). The sample size was determined using Cochran's formula (Cochran, 1977) [18].

The formula used in equation seems to follow the standard form of Cochran's formula:

$$n = \frac{N \times P(1 - P)}{[(N - 1)(d^2 \div z^2)] + p(1 - p)}$$

where:

- n = required sample size
- N = population size (318)
- P = estimated proportion (0.5 for maximum variability)
- z = z -value corresponding to the desired confidence level (1.96 for 95%)
- d = margin of error (0.05)

The total sample size was 87 participants.

The study's inclusion criteria ensured that participants possessed the necessary qualifications and experience to offer meaningful insights into financial management practices. Eligible nurse leaders were required to hold a bachelor's degree in nursing or higher, such as a master's or doctoral degree. Furthermore, participants needed at least five years of nursing experience, including a minimum of two years in a leadership or managerial position,

such as Regional Nurse Manager, Chief Nursing Officer, or Nurse Manager.

Measurements

Part I

Socio demographic characteristics A demographic questionnaire assessed the participants' characteristics including gender, age, highest nursing degree, and employment status.

The Nurse Leaders' Financial Management Practices Assessment (NLFMP) This tool was adapted by the researcher from the Financial Management Behavior Scale (FMBS) by Dew and Xiao (2011) [19] and the Practice Environment Scale of the Nursing Work Index (PES-NWI) by Lake (2002) [20], with modifications to address financial management practices specific to nursing leadership and their perceived impact on patient outcomes. To evaluate nurse leaders' perceptions of their financial management practices, focusing on five dimensions: Budgeting, Resource Allocation, Cost-Effectiveness, Decision-Making, and Impact on Patient Care. The tool consists of 15 items rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with qualitative open-ended question with each dimension, higher scores reflecting better-perceived financial management capabilities. Scores above 65 indicate high proficiency, 38–64 represent moderate proficiency, and scores below 38 indicate low proficiency. Content validity was established by healthcare financial experts to ensure the tool's accuracy and relevance.

Part II

Qualitative data Open-ended responses was thematically analysed to identify common themes and provide deeper insights into how financial decisions impact patient outcomes include five questions as please describe any challenges you face in managing the department's budget and areas do you believe resource allocation could be improved in your department.

Fieldwork

The fieldwork for this study took place over a three-month period, from April to June 2024, in selected private hospitals across Egypt. Hospitals were selected through a simple random sampling method from four primary regions: Northern, Upper, Eastern, and Western Egypt. Eligible nurse leaders were identified using a non-probability convenience sampling approach, targeting individuals in leadership positions such as Regional Nurse Managers, Chief Nursing Officers, and Nurse Managers. Prior to data collection, ethical approval was

secured from the Ethical Committee of the Faculty of Nursing at Helwan University, along with necessary permissions from hospital administrations. Participants underwent careful screening to ensure they met the inclusion criteria, including required educational qualifications and leadership experience.

Data collection involved administering The Nurse Leaders' Financial Management Practices Assessment (NLFMP), a structured questionnaire designed to assess financial management practices across five dimensions: Budgeting, Resource Allocation, Cost-Effectiveness, Decision-Making, and Impact on Patient Care. The questionnaire included both closed-ended items rated on a 5-point Likert scale and open-ended questions for qualitative insights. Researchers distributed the questionnaires in person and provided participants with a comfortable, private environment to complete the survey during their work shifts, ensuring minimal disruption to their responsibilities. Each questionnaire took approximately 10–20 min to complete, and informed consent was obtained from all participants after explaining the study's purpose, voluntary nature, and confidentiality protocols. Following data collection, all completed questionnaires were securely collected and anonymized to maintain participant confidentiality. Quantitative data were analyzed using IBM SPSS Statistics (version 26.0), while open-ended responses were transcribed verbatim and subjected to thematic analysis to identify recurring themes and gain deeper insights. This methodical approach to fieldwork ensured a comprehensive understanding of nurse leaders' financial management practices while respecting the time and commitments of the participants.

Qualitative data were collected from a nurse leaders using semi-structured interviews and open-ended survey responses to gain deeper insights into their financial management experiences. Participants were selected through purposive sampling to ensure diversity in age, experience, and job roles (Chief Nursing Officers, Nurse Managers, Regional Nurse Managers). Interviews were conducted face-to-face or via Zoom, lasting 30–45 min, and were audio-recorded with consent. Open-ended questions explored financial decision-making challenges, budgeting constraints, and resource allocation strategies, encouraging participants to share real-life experiences. Additionally, open-ended survey responses provided further qualitative input, allowing participants to elaborate on key financial management practices. Thematic analysis was used to identify recurring patterns, such as budget limitations, staffing shortages, and the impact of financial decisions on patient care, which were then integrated with quantitative findings for a comprehensive understanding of nurse leaders' financial competencies.

A coding framework was developed to identify recurring themes, such as budget constraints, staffing shortages, and financial decision-making influence. Thematic findings were then compared with quantitative results to integrate insights and highlight consistencies or discrepancies.

Reliability analysis

The internal consistency of the Nurse Leaders' Financial Management Practices Assessment (NLFMP) tool was assessed using Cronbach's alpha to ensure its reliability within the study sample. After refining the items, the overall Cronbach's alpha was recalculated and found to be 0.82, indicating strong internal consistency. The reliability analysis for each subscale showed acceptable to high consistency, with Budgeting Practices having the highest reliability ($\alpha=0.85$), followed by Cost-Effectiveness ($\alpha=0.81$), Patient Impact ($\alpha=0.80$), Resource Allocation ($\alpha=0.79$), and Decision-Making Influence ($\alpha=0.76$). These results confirm that the NLFMP tool is a reliable measure for assessing financial management practices among nurse leaders in this study.

Test-retest reliability

The stability of the Nurse Leaders' Financial Management Practices Assessment Tool was evaluated using test-retest reliability. A follow-up survey was administered to the same 87 participants two weeks after the initial survey, and the results were analyzed using the Spearman correlation coefficient. The analysis yielded strong stability across all factors, with Budgeting Practices scoring 0.85, Resource Allocation 0.82, Cost-Effectiveness 0.79, Decision-Making Influence 0.78, and Patient Impact 0.81. These high correlation coefficients confirm the tool's reliability and consistency over time, further validating its use in assessing nurse leaders' financial management practices.

Exploratory Factor Analysis (EFA)

Bartlett's test of sphericity was performed to determine the adequacy of the data for factor analysis, yielding a significant result ($p<0.001$). Additionally, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated and surpassed the minimum acceptable value of 0.7, confirming the suitability of the dataset for factor analysis, as mentioned in Table 1.

Data analysis

Quantitative analysis

The statistical analysis for this study was carried out using IBM SPSS Statistics, version 26.0, applying both univariate and multivariate methods to explore the relationships between nurse leaders' perceptions of financial management practices and patient care quality and outcomes.

Mean and frequency distributions were calculated to evaluate perceptions across various dimensions. The reliability and internal consistency of the questionnaire were assessed using Cronbach's alpha. Additionally, t-tests and Analysis of Variance (ANOVA) were performed to compare group means and determine significant differences based on sociodemographic characteristics. To identify key predictors of nurse leaders' readiness and perceptions regarding financial management practices, two multiple linear regression analyses were conducted. A significance threshold of $p<0.05$ was used to determine statistical significance.

Qualitative analysis

The qualitative data in this study were analyzed using thematic analysis, following a six-step process to ensure a structured and systematic approach. First, interview transcripts and open-ended survey responses were transcribed and reviewed for familiarization. An inductive coding approach was used to assign codes to meaningful text segments, identifying key themes such as budget constraints, staffing shortages, and financial decision-making influence. These themes were refined, reviewed, and categorized under the study's financial management domains. Researchers ensured accuracy by cross-checking themes with original transcripts, resolving discrepancies through consensus. Each theme was clearly defined, with representative participant quotes selected to illustrate key findings. Finally, qualitative themes were integrated with quantitative data to explain statistical trends, ensuring a comprehensive understanding of nurse leaders' financial management experiences. This approach provided context, validation, and deeper insight into the challenges and competencies of financial decision-making in nursing leadership.

Results

Table 2 presents the sociodemographic characteristics of the 87 participants and their association with perceptions of nurse leaders' financial management practices. According to Gender were not statistically significant difference at ($p=0.214$), despite a variation in mean scores between males (22.41 ± 15.09) and females (52.59 ± 10.19). In contrast, age had a significant impact, with participants over 40 years reporting the highest mean scores (39.66 ± 7.50), followed by those aged 35–40 years (27.59 ± 10.50) and those under 35 years (7.76 ± 13.22) ($p=0.010$). Educational attainment also influenced perceptions, with MSN holders scoring highest (45.69 ± 10.80), followed by BSN (16.38 ± 5.50) and PhD holders (12.93 ± 6.00) ($p=0.044$). Employment status was another key factor, with Regional Nurse Managers reporting the highest scores (35.16 ± 7.00), followed by Nurse Managers (27.34 ± 8.50) and Chief Nursing Officers (12.50 ± 5.00) ($p=0.009$).

Table 1 Factor Loadings for Nurse Leaders' Financial Management Practices Assessment (NLFMP) tool

Item	Factor 1 (Budgeting)	Factor 2 (Resource Allocation)	Factor 3 (Cost-Effectiveness)	Factor 4 (Decision-Making)	Factor 5 (Patient Impact)
I am actively involved in the budgeting process for my department.	0.569				
The budget I help manage is sufficient to cover the critical needs of my department.	0.47				
I feel confident in my ability to manage the budget effectively within my department.	0.409				
I have enough resources (e.g., staffing, equipment) to meet the needs of patient care in my department.		0.537			
I am involved in decisions about how resources are allocated in my department.		0.463			
The financial resources allocated to my department are used efficiently to improve patient outcomes.		0.49			
I regularly implement cost-saving measures without compromising patient care.			0.429		
Financial decisions I make help improve the overall efficiency of my department.			0.444		
Cost-effectiveness strategies are carefully balanced with patient care priorities in my department.			0.415		
I feel that my input is valued in financial decisions at the organizational level.				0.646	
I have the authority to make significant financial decisions regarding staffing and resource allocation.				0.803	
I am able to advocate for more resources when necessary.				0.42	
My financial decisions positively impact patient outcomes in my department.					0.526
Budget constraints have negatively affected the quality of patient care.					0.844
I have sufficient financial resources to ensure high-quality care in my department.					0.718

Table 2 Sociodemographic characteristics of the studied subjects (N=87)

Sociodemographic characteristics	N	(%)	Perceptions of nurse leaders' financial management practices (Mean ± SD)	P
Gender				
Male	26	29.8	22.41 ± 15.09	0.214
Female	61	70.12	52.59 ± 10.19	
Age				
Less than 35 years	9	10.3	7.76 ± 13.22	0.010
35–40 years	32	36.7	27.59 ± 10.50	
> 40 years	46	52.8	39.66 ± 7.50	
Highest Nursing Degree Earned				
Bachelor of Science in Nursing (BSN)	19	21.8	16.38 ± 5.50	0.044
Master of Science in Nursing (MSN)	53	60.9	45.69 ± 10.80	
Nursing PhD.	15	17.3	12.93 ± 6.00	
Current Employment Status				
Chief Nursing Officer	16	18.2	12.50 ± 5.00	0.009
Nurse Manager	35	40.1	27.34 ± 8.50	
Regional Nurse Manager	45	51.7	35.16 ± 7.00	

Table 3 Perceived financial management practices among nursing leadership (N=87)

Financial management practices dimensions	N	(%)	Mean ± SD
Budgeting Practices	70	80.4	3.90 ± 0.50
Resource Allocation	65	74.7	3.85 ± 0.55
Cost-Effectiveness	68	78.2	4.05 ± 0.45
Decision-Making Influence	72	82.8	4.10 ± 0.48
Impact on Patient Care and Outcomes	64	73.6	3.95 ± 0.47
Total	87	100	39.85 ± 4.22

These findings suggest that age, education level, and job role significantly shape nurse leaders' perceptions of financial management practices.

Table 3 summarizes nursing leadership's perceived financial management practices across five key dimensions. Decision-Making Influence had the highest mean score (4.10 ± 0.48), with 82.8% of participants reporting proficiency. Cost-Effectiveness (4.05 ± 0.45) and Impact on Patient Care and Outcomes (3.95 ± 0.47) also received high ratings, indicating strong financial management capabilities in resource utilization and patient care.

Budgeting Practices (3.90 ± 0.50) and Resource Allocation (3.85 ± 0.55) were slightly lower, highlighting areas for improvement. The overall mean score (39.85 ± 4.22) reflects generally strong financial management skills among participants, with opportunities for targeted training to enhance specific competencies.

Table 4 summarizes financial management practice levels among 87 nurse leaders. The majority (70.0%) demonstrated a moderate level of practice, indicating room for improvement. A smaller portion (16.1%) fell into the low practice category (mean = 59.05 ± 11.73), while only 0.9% exhibited high financial management proficiency. These findings highlight the need for targeted training and interventions to strengthen financial competencies among nursing leaders.

Figure 1 illustrates that 87.3% of nurse managers perceive a connection between financial management practices and patient care outcomes. These findings emphasize the crucial role of effective financial management in enhancing patient care quality.

Table 5 presents the multiple linear regression analysis of demographic and professional factors influencing perceived financial management proficiency among nurse leaders. Age was a significant predictor, with those aged 35–40 scoring higher than those under 35 ($p = 0.033$), and those over 40 showing even greater proficiency ($p = 0.017$). Educational attainment also played a key role, with MSN holders scoring significantly higher than BSN holders ($\beta = 0.501$, $p < 0.001$), while the difference between MSN and PhD holders was not statistically significant ($p = 0.059$). Employment status further influenced perceptions, with Chief Nursing Officers scoring significantly higher than Nurse Supervisors ($p < 0.001$), and Nurse Managers reporting higher proficiency than both Chief Nursing Officers ($p = 0.012$) and Regional Nurse Managers ($p = 0.031$). The model explained 32% of the variance in financial management proficiency ($R^2 = 0.320$, Adjusted $R^2 = 0.564$), highlighting age, education, and job role as key determinants.

Table 6 provides a thematic analysis of nurse leaders' perceptions of financial management practices. Key themes include Budgetary Constraints, where limited financial resources delay the procurement of essential equipment. Staffing Adequacy highlights how reduced staffing levels compromise patient safety and care quality. The theme of Cost-Effectiveness vs. Care Quality underscores the ongoing challenge of balancing financial efficiency with maintaining high standards of patient care. Additionally, Leadership's Role in Decision-Making reveals nurse leaders' frustration with their limited involvement in financial planning. However, Decision-Making Influence demonstrates that greater participation in financial decisions enables better resource allocation and leads to improved patient outcomes.

Table 4 Nurse leaders' financial management perceived practice levels ($N = 87$)

Practice level	N	(%)	Mean \pm SD
Low	14	16.1	59.05 ± 11.73
Moderate	61	70.0	
High	7	0.9	

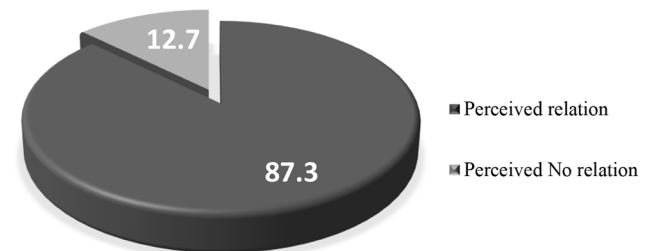


Fig. 1 Leaderships perceived about the relation between Financial Management Practices and Patient Care outcomes

Table 5 Multiple linear regression for perceived financial management practices

Variables	β	SE	T	P
Age (< 35 vs. 35 ~ 40)	0.021	0.036	2.101	0.033
Age (35 ~ 40 vs. > 40)	0.037	0.041	3.025	0.017
Nursing degree earned (BSN vs. MSN)	0.501	0.077	6.509	< 0.001
Nursing degree earned (MSN vs. PhD)	0.201	0.025	0.331	0.059
Current employment status (Nurse supervisor vs. Chief Nursing Officer).	0.141	0.051	2.664	< 0.001
Current employment status (Chief Nursing Officer vs. Nurse manager).	0.184	0.08	2.400	0.012
Current employment status (Nurse manager vs. Regional Nurse manager).	0.092	0.070	2.333	0.031
R^2	0.320			
Adjusted R^2	0.564			

Triangulation approach for data integration

A triangulation approach was used to integrate quantitative and qualitative findings, ensuring a comprehensive understanding of nurse leaders' financial management practices. Thematic analysis of qualitative data was compared with quantitative results to validate, expand, and explain key trends across five domains: budgeting practices, resource allocation, cost-effectiveness, decision-making influence, and impact on patient care.

Quantitative results indicated that budgeting practices had a moderate mean score (3.90 ± 0.50), suggesting variability in budgeting proficiency. Qualitative findings expanded on this by revealing that nurse leaders faced challenges due to limited financial training and unclear budget policies, affecting their ability to allocate funds effectively. Similarly, resource allocation scored slightly lower (3.85 ± 0.55), with qualitative insights highlighting frustration over financial constraints and limited decision-making authority, which restricted nurse leaders' ability to allocate resources efficiently.

Table 6 Thematic analysis of nurse leaders' perceptions of financial management practices

Theme	Unit of Meaning	Description	Illustrative Quotes
1. Budgetary Constraints and Resource Allocation	Financial limitations hinder resource availability.	Nurse leaders reported difficulties in managing budgets while ensuring the availability of necessary resources for patient care. Budget restrictions delayed procurement of essential supplies and equipment.	"We often have to delay purchasing new equipment because the budget doesn't allow for it." (P2) "The allocation of funds rarely covers everything we need, so we have to prioritize." (P10)
2. Staffing Adequacy and Patient Care	Staffing shortages undermine care quality and safety.	Budget cuts led to reduced staffing levels, which increased nurse workloads and compromised patient safety and care quality.	"With fewer nurses, we can't keep up with patient needs." (P8) "Cutting staff means patient care suffers." (P16)
3. Balancing Cost-Effectiveness with Care Quality	Financial efficiency vs. patient care quality trade-off.	Nurse leaders faced a challenge in balancing cost-saving measures with maintaining high-quality patient care, often leading to negative impacts on patient satisfaction.	"We're constantly asked to do more with less." (P12) "Cost-efficiency is important but can compromise care." (P23)
4. Decision-Making Influence	Greater involvement in decision-making leads to better patient outcomes.	Nurse leaders noted that when they are more involved in financial decisions, they can advocate for patient care needs and improve outcomes.	"When we have a say in financial decisions, we can better advocate for patient care." (P9) "Having influence means we can allocate resources where they are most needed." (P14)
5. Financial management practices Impact on Patient Care Outcomes	Lack of involvement in financial planning limits patient care outcome.	Nurse leaders expressed frustration over their limited involvement in financial decision-making, noting that their insights were often not considered in budget planning which directly effect on patient outcomes.	"Our insights are not always considered in budget decisions affecting patient care quality." (P6) "There's a disconnect in decision-making." (P19)

The cost-effectiveness domain received a relatively high rating (4.05 ± 0.45), which qualitative findings validated by showing that nurse leaders employed strategic cost-saving measures such as optimizing staff shifts and negotiating supplier agreements. However, some participants expressed concerns that balancing cost-efficiency with maintaining care quality was a constant challenge. Decision-making influence had the highest mean score (4.10 ± 0.48), with qualitative responses confirming that senior nurse leaders felt empowered in financial decisions, while those in lower positions had limited involvement in budgetary planning.

The final domain, impact on patient care and outcomes, was strongly rated (3.95 ± 0.47), with qualitative findings reinforcing that financial constraints, such as staff shortages and limited medical supplies, directly affected patient care quality. Participants emphasized that poor financial decisions could lead to staff burnout and compromised patient safety. The integration of both datasets provided a holistic perspective, ensuring that numerical trends were supported by real-world experiences.

This triangulation approach strengthened the study's credibility and depth, demonstrating how financial management practices impact hospital operations and patient outcomes. The findings suggest that enhanced financial training and broader involvement in budgetary decisions could improve nurse leaders' ability to manage resources effectively while maintaining care quality.

Discussion

The purpose of this study was to assess nurse leaders' perceptions regarding their financial management practices and their relation to patient care quality and outcomes.

Statistical analysis revealed that over two-thirds of nurse leaders exhibit a moderate level of financial management practices. This finding suggests that these leaders are generally better prepared to undertake complex financial responsibilities, as the majority hold master's or doctorate degrees in nursing, indicating strong competencies in financial management practices.

Budgeting practices and financial training gaps

The study found that budgeting proficiency among nurse leaders was moderate (Mean = 3.90 ± 0.50), indicating variability in financial management skills. While some nurse leaders demonstrated competence in budgeting, qualitative findings revealed significant challenges related to limited financial training and unclear budget policies, which hindered their ability to effectively allocate funds. Participants expressed concerns that budget restrictions often forced them to make difficult trade-offs between staffing, equipment purchases, and operational costs, ultimately affecting healthcare service delivery. These findings suggest that structured financial training programs could enhance nurse leaders' budgeting skills, enabling them to make more informed financial decisions. The results of other studies align with our findings. For instance, Paarima et al. [21] conducted a study in Ghana that assessed the financial management skills of nurse managers in the eastern region of Ghana. It demonstrated that nurses perceive moderate financial competencies. Similarly, Welch [22] explored whether nurse managers feel competent in the financial and business aspects of their roles and found that the strongest predictors of self-perceived financial competence were continuing education and MSN degrees. On the other hand,

the present results contradict Sharma et al. [23], who evaluated a training program for life skills education and financial literacy for community health workers in India and reported that the majority of participants exhibited low financial competencies prior to the program.

Cost-effectiveness and the challenge of balancing efficiency with quality

Cost-effectiveness had a relatively high rating (Mean = 4.05 ± 0.45), reflecting nurse leaders' ability to implement strategic cost-saving measures while maintaining operational efficiency. Qualitative findings validated this by showing that nurse leaders actively optimized staff scheduling, negotiated supplier contracts, and minimized waste to control hospital expenses. However, some participants expressed concerns that balancing cost-efficiency with maintaining care quality remained a constant challenge. Cost-cutting measures, if not carefully planned, could lead to resource shortages and reduced service availability, potentially compromising patient safety and treatment effectiveness. These findings highlight the importance of financial literacy in enabling nurse leaders to balance economic constraints with patient-centered care. Paarima et al. [21] also found a positive correlation between nurses' perceptions of financial skills and the quality of patient care. Similarly, McFarlan [24] noted a positive relationship between nurse managers' knowledge of healthcare financial management and their quality-of-care level in their units. Conversely, the present study's findings oppose the results of Naranjee et al. [9], who reported that financial management roles of nurse managers in selected public hospitals in KwaZulu-Natal, South Africa, did not directly impact patient care but instead focused on staff nurses' practices.

Decision-making influence and leadership empowerment

Decision-making influence received the highest mean score (4.10 ± 0.48), with qualitative responses confirming that senior nurse leaders felt empowered in financial decision-making, while those in lower positions had limited involvement in budgetary planning. Participants emphasized that nurse managers and unit-level leaders often had minimal influence over financial decisions, despite their direct responsibility for patient care. This discrepancy suggests a hierarchical gap in financial leadership, where financial authority is concentrated at higher administrative levels, limiting frontline leaders' ability to advocate for resource allocations that directly impact patient care. Expanding financial decision-making opportunities across all leadership levels may improve resource distribution, enhance efficiency, and foster a culture of financial accountability within healthcare organizations. Töre and Uysal [25] reported that significant

positive correlation was found between school principals' empowering leadership characteristics and teachers' participation in decision-making. Also, McFarlan [24] found that an experiential educational intervention improved nurse managers' knowledge and self-assessed competence with healthcare financial management.

Resource allocation and financial constraints

Resource allocation received a slightly lower score (Mean = 3.85 ± 0.55), with qualitative data highlighting nurse leaders' frustrations over financial constraints and limited decision-making authority. Many participants reported that financial decisions were primarily controlled by hospital administrators, restricting their ability to distribute resources based on patient needs. This lack of autonomy often led to delays in purchasing essential medical supplies, understaffing, and operational inefficiencies. The integration of findings underscores the need for greater involvement of nurse leaders in financial decision-making, ensuring that budget allocations align with clinical priorities to enhance patient care outcomes. Paarima et al. [21] similarly observed that budgetary constraints hindered nurse managers' ability to secure essential resources in healthcare settings, especially in units like emergency care, where immediate access to resources is critical. Brydges et al. [26] similarly reported that nurse leaders need better education on the application of financial knowledge and practices to improve resource distribution in hospitals [26].

Impact on patient care and outcomes

The study confirms that financial management practices have a direct impact on patient care outcomes (Mean = 3.95 ± 0.47). Qualitative findings reinforced that financial constraints, including staff shortages and limited medical supplies, negatively affected patient safety and treatment quality. Participants emphasized that poor financial decisions often resulted in staff burnout, delayed treatments, and compromised patient safety. These results underscore the critical role of financial management in ensuring safe, high-quality healthcare services. Ensuring that nurse leaders have adequate financial knowledge and decision-making authority can significantly improve hospital efficiency, patient outcomes, and overall care quality. Similarly, Otoo [27] also noted the impact of financial management practices on organizational performance and patient safety. Zhang & Bohlen [28] emphasized the importance of balancing healthcare business budgeting with maintaining care standards to avoid diminishing patient outcomes.

The study also found that age was a significant factor, with older nurse leaders—particularly those aged 35–40 and over 40—demonstrating higher levels of financial management proficiency. Chief nursing officers and

nurse managers displayed the highest proficiency levels in financial management, likely attributed to their experience and roles involving direct involvement in budget planning, resource allocation, and cost-effectiveness measures. Bayram et al. [29] similarly noted a positive relationship between nurses' demographic characteristics and their financial competencies. Additionally, Sharma et al. [23] found that socio-demographic attributes, such as age and experience, were associated with financial literacy among community health workers.

Our findings illustrated that 87.3% of nurse managers perceive a strong connection between financial management practices and patient care outcomes, underscoring the critical role of effective financial management in healthcare quality and efficiency. This high percentage suggests that nurse managers recognize financial decision-making as an essential component of hospital operations, directly impacting staffing, resource availability, and patient safety. These results supported with the study by Homauni et al. [30] emphasized the role of budgeting in improving care standards and outcomes, while inadequate budgeting was found to compromise patient safety and satisfaction [30].

Conclusion

This study highlights the essential role of financial management in nursing leadership, emphasizing how budgeting, resource allocation, cost-effectiveness, and decision-making influence impact patient care outcomes. The findings indicate that budgeting and resource allocation are the most significant challenges, with nurse leaders lacking formal training in financial forecasting, cost analysis, and strategic budget planning. Limited decision-making authority further restricts their ability to optimize resources and allocate funds effectively.

While nurse leaders demonstrate moderate to high proficiency in cost-effectiveness, many struggle to balance financial efficiency with maintaining care quality, often facing pressures to reduce costs without compromising patient safety. To address these gaps, integrating financial management training into nursing leadership programs is crucial, focusing on budgeting fundamentals, cost-control strategies, and healthcare financial planning. Expanding nurse leaders' involvement in financial decision-making could enhance hospital efficiency, improve resource utilization, and strengthen patient care delivery.

Future research should explore the impact of structured financial training interventions on nurse leaders' decision-making abilities and long-term financial competencies. Strengthening financial skills among nurse leaders can lead to better resource allocation, enhanced cost efficiency, and improved patient care outcomes, ensuring a sustainable and high-quality healthcare system.

Implications for practice

To support nurse leaders in improving financial competencies, healthcare institutions should: Incorporate formal financial training into academic curricula and continuing education programs tailored for nursing leaders. Facilitate active participation of nurse leaders in financial decision-making processes, particularly in budget planning and resource allocation, to promote patient-centered care. Develop frameworks that enable nurse leaders to balance cost-efficiency with maintaining high care standards. Provide organizational support and mentorship to nurse leaders, enabling them to navigate financial challenges and advocate for resources that align with patient needs.

Limitations

First, the sample was limited to nurse leaders in private hospitals in Egypt, which may restrict the generalizability of findings to public healthcare settings or other regions. Future research should include a more diverse sample across various healthcare institutions to enhance applicability. Second, the cross-sectional design captures perceptions at a single point in time, limiting insights into long-term trends or the evolving impact of financial training on nurse leaders' competencies. A longitudinal study could provide a deeper understanding of how financial literacy develops over time and its sustained impact on hospital efficiency. Additionally, self-reported data may introduce social desirability bias, as participants might have overestimated their financial management capabilities. Combining self-assessments with objective financial performance indicators could strengthen the reliability of findings.

Supplementary Information

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Supplementary Material 1

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Data availability

The data are provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained from the Ethical Committee of the Faculty of Nursing at Helwan University (No. (44)25.11.2024). We confirm that our study was conducted in accordance with the principles outlined in the Declaration of Helsinki. The questionnaires were shared with the study participants, with a clear explanation of the study's purpose and the questionnaire items. Written informed consent was obtained from all participants. They were informed about the privacy of their information, assured that the data would be used exclusively for scientific research, and notified that the study was voluntary and harmless. Participants had the right to refuse participation or withdraw from the study at any time. No identifying information was collected to ensure anonymity.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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