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The Influence of Training and Development, Education and Learning, Performance Management, and Career Development on Nurses' Performance

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Abstract

This study aims to analyze the effect of Training and Development, Education and Learning, Performance Management, and Career Development on nurse performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital, North Penajam Paser Regency. The study used a quantitative design with a survey approach, supplemented by qualitative data to obtain a comprehensive understanding. Quantitative data were collected through a Likert-scale questionnaire from the entire population of 31 nurses, while qualitative data were obtained through semi-structured interviews and documentation studies. Data analysis was conducted using descriptive analysis and multiple linear regression to test the partial and simultaneous effects of independent variables on nurse performance. The results showed that partially, Training and Development, Education and Learning, and Career Development did not significantly influence nurse performance. Conversely, Performance Management significantly influenced nurse performance. However, simultaneously, all four human resource development variables significantly influenced nurse performance. These findings indicate that in standardized, high-risk clinical work units such as hemodialysis, an objective performance management system, regular evaluations, and consistent feedback are dominant factors in improving performance. Meanwhile, individual development factors serve more as supporting factors that contribute collectively. This study recommends strengthening the performance management system integrated with human resource development programs and adjusting development policies based on the characteristics of the work unit.

Introduction

In an era of increasingly complex healthcare transformation, a hospital's success in providing quality services is largely determined by the performance of its human resources, particularly nurses. Nurses are the spearhead of the healthcare system because they interact directly and intensively with patients (Asmara et al., 2025). According to Widyaningrum et al. (2025), the role of human resources in healthcare becomes even more crucial when associated with specialized service units that demand high technical competence, consistent performance, and strong physical and mental resilience (Olorunfemi et al., 2024; Younas et al., 2023; Al Dighrir et al., 2024).

One such unit is the hemodialysis unit, a medical service intended for patients with chronic kidney disease who require regular dialysis procedures (Darsini, & Cahyono, 2023). In this unit, nurses not only perform medical procedures but also accompany patients through long-

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term, invasive and repetitive therapy. According to Rahmasari & Supriyadi (2023), hemodialysis units require high standards of service due to the significant medical risks involved, ranging from infections and cardiovascular disorders to other emergency conditions. Furthermore, nurses interact with patients for relatively long periods of time and regularly (usually 2–3 times a week), which indirectly demands good interpersonal skills, patience, and an understanding of the emotional state of patients, who often experience stress due to their chronic illnesses (Godiya et al., 2025; Akif et al., 2024; Teixeira et al., 2024).

Given such complexity, human resource development, particularly among nurses, is a crucial aspect to consider in hospital management (Maulida et al., 2025; Wang et al., 2024; Zhu et al., 2024). Technical competencies such as mastery of dialysis procedures, use of hemodialysis machines, and the ability to handle complications must be continuously improved through training and ongoing education. At the same time, non-technical aspects such as therapeutic communication, professional ethics, and job satisfaction also need to be developed to ensure that nurses can work professionally, efficiently, and humanely (Wulandari & Sumanti, 2022; Ješić et al., 2026; Alkhaqani & Najaf, 2025).

In this study, Human Resource Development (HRD) was measured through four independent variables: Training and Development, which is the improvement of nurses' skills through ongoing training programs (Noe, 2020); Education and Learning, which includes formal and non-formal education to enhance professionalism (Saks & Haccoun, 2010); Performance Management, which includes competency-based evaluation and ongoing feedback (Armstrong & Baron, 2004) and Career Development, which includes career paths and promotions to increase motivation and retention (Bratton & Gold, 2017). These four variables were analyzed to determine their influence on nurse performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital. This is especially important in specialized care units such as hemodialysis units, where nurses are required not only to possess high technical skills but also to be able to work under pressure, maintain patient safety, and provide ongoing psychological support (Ayuningtyas & Wibowo, 2024). Therefore, focusing on human resource development in hemodialysis units not only improves individual performance but also directly contributes to the overall quality of hospital services. Within this context, research is crucial to assess the extent to which human resource development impacts nurse performance, particularly in the hemodialysis unit at Ratu Aji Putri Botung Regional Hospital, North Penajam Paser Regency, a referral hospital facing service challenges in a developing region.

The Hemodialysis Unit at Ratu Aji Putri Botung Regional Hospital, North Penajam Paser Regency, plays a crucial role in caring for patients with chronic kidney disease who require regular therapy. However, in practice, challenges such as limited ongoing training, limited continuing education, and a lack of structured career development remain obstacles that can impact nurse performance. To support this phenomenon, the following is a description of the number and education level of nurses in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital in 2025. Based on the data collected, there are 31 nurses working in the unit, with bachelor's (S1) and diploma (D3/Diploma) degrees. This composition indicates that the majority of nurses are still diploma graduates. Nevertheless, the presence of nursing staff with bachelor's (S1) degrees contributes to strengthening academic and professional capacity in the implementation of hemodialysis services. This difference in education level is a crucial aspect in developing competency and improving the quality of service in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital.

At Ratu Aji Putri Botung Regional Hospital, North Penajam Paser Regency, the hemodialysis unit plays a strategic role in treating patients with chronic kidney disease who require routine

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and intensive care. This unit demands high levels of nurse performance, including technical skills, precision in medical procedures, communication skills, and emotional stability in caring for chronic patients. However, in practice, challenges such as limited ongoing training, lack of career development, and limited access to professional development often hinder optimal performance.

Although human resource development is believed to contribute to improved nurse performance, its implementation in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital still faces various obstacles. Training is not sustainable and lacks specificity, access to further education is limited, performance management is not competency-based and feedback-based, and career development is not well-structured. This situation reflects a gap between the ideal concept of human resource development and the reality on the ground, which can impact suboptimal nurse performance. Therefore, an empirical study is needed to analyze the influence of the four dimensions of human resource development on nurse performance in the unit. In addition to the challenges of human resource development, the increasing number of patient visits to the Hemodialysis (HD) Unit of Ratu Aji Putri Botung Regional Hospital indicates a steadily increasing workload from year to year. This increase not only impacts the need for healthcare workers but also affects the optimal utilization of hemodialysis facilities and infrastructure.

A more significant increase occurred in 2025, when the number of visits reached 5,908. Although 15 machines were added that year, the surge in patient numbers still indicated high service pressure. This situation indicates that the demand for hemodialysis services continues to rise and requires capacity building planning, both in terms of human resources and infrastructure, to maintain service quality. The increasing demand for hemodialysis services directly impacts nurses' workload, both in performing dialysis procedures, monitoring patient conditions during procedures, and managing potential complications (Thomas-Hawkins et al., 2022; Dhanda et al., 2026). This situation emphasizes that in addition to the readiness of facilities and infrastructure, the readiness and competence of human resources, particularly nurses, are key factors in maintaining service quality and safety. Therefore, human resource development through training, continuing education, performance management, and career development is increasingly crucial to ensure optimal nurse performance amidst the increasing service load.

To address these challenges, systematic and structured human resource development is crucial. This includes technical and non-technical training, continuing education, internship or job rotation programs, mentoring, and competency-based incentives. The implementation of appropriate human resource development is believed to improve nurses' knowledge, skills, attitudes, and motivation in carrying out their duties professionally. As a theoretical basis, this study draws on the Human Capital Theory (Becker & Gary, 1993), which states that investment in education, training, and work experience will increase individual productivity. Within this context, nurses who receive adequate human resource development will have a higher capacity to work effectively and efficiently, thus impacting their performance. This theory is relevant to explain how human resource development can be a strategic asset in improving the performance of healthcare workers.

Furthermore, Barney's (1991) Resource-Based View (RBV) theory is also used as a conceptual foundation. This theory states that an organization's internal resources, including superior human resources, constitute a sustainable competitive advantage. Competent and well-trained nurses are a difficult-to-imitate resource that can add value to hospitals. The urgency of this study lies in the need for empirical data to assess the extent to which human resource

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development significantly impacts nurse performance, particularly in regional hospitals with limited facilities. This research is also expected to provide strategic recommendations for the management of Ratu Aji Putri Botung Regional Hospital in formulating HR development policies based on the needs of work units.

Methods

Research Design

This study employed a quantitative research design using an explanatory survey approach complemented by qualitative data. The explanatory design was selected because the primary objective of this research is to examine the causal relationships between human resource development variables and nurses' performance. The independent variables consist of training and development, education and learning, performance management, and career development, while the dependent variable is nurses' performance. The quantitative approach enables the researcher to measure perceptions systematically and to test hypotheses through statistical procedures, thereby providing empirical evidence regarding the magnitude and direction of influence among variables.

In addition to the quantitative approach, qualitative data were incorporated to enrich the interpretation of statistical findings. Qualitative information was obtained through semi-structured interviews and document review to explore contextual factors such as organizational culture, leadership practices, and work environment conditions that may influence nurses' performance. The integration of quantitative and qualitative data strengthens the comprehensiveness of the study by combining measurable analysis with contextual understanding, ensuring that the findings are both statistically valid and substantively meaningful.

Research Location and Time

The research was conducted at the Hemodialysis Unit of RSUD Ratu Aji Putri Botung. This unit was selected because it represents a specialized healthcare service area with high workload intensity, technical complexity, and continuous patient care demands, requiring optimal human resource management practices. The research was carried out over a three-month period, from December 2025 to February 2026. This timeframe included instrument preparation, data collection, data processing, and statistical analysis.

Types and Sources of Data

This study utilized both quantitative and qualitative data. Quantitative data consisted of numerical information obtained through structured questionnaires distributed to nurses in the Hemodialysis Unit. These data were used to measure the variables statistically and to test the proposed hypotheses using regression analysis. Qualitative data, on the other hand, consisted of descriptive narratives collected through interviews and documentation review. These data were used to provide deeper explanations and contextual interpretation of the quantitative findings.

The sources of data were divided into primary and secondary sources. Primary data were obtained directly from nurses through questionnaire responses and interviews. Secondary data were collected from hospital internal reports, human resource development policy documents, performance evaluation records, and relevant literature that supported the theoretical framework of the study.

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Data Collection Methods

Data were collected using questionnaires, interviews, and literature review. The questionnaire served as the primary instrument for collecting quantitative data. It was developed based on the operational indicators of each research variable and utilized a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The training and development variable measured aspects such as training availability, relevance of materials, frequency of training, and evaluation of training outcomes. The education and learning variable included participation in further study, certified training programs, access to learning resources, and application of knowledge in practice. Performance management was measured through indicators such as objectivity of appraisal, feedback provision, routine evaluation, and follow-up actions. Career development covered career planning, promotion opportunities, institutional support, and satisfaction with career progression. Nurses' performance was assessed based on service quality, timeliness, compliance with standard operating procedures, and patient satisfaction.

Interviews were conducted in a semi-structured manner to obtain deeper insights regarding the implementation of human resource development policies and the challenges faced by nurses in delivering hemodialysis services. Literature review was also conducted to strengthen the theoretical foundation, construct operational indicators, and support the interpretation of research findings.

Population and Sample

The population of this study consisted of all nurses working in the Hemodialysis Unit of RSUD Ratu Aji Putri Botung, totaling 31 individuals. Since the population size was relatively small, this study applied a total sampling (census) technique, meaning that all members of the population were included as research respondents. The use of total sampling minimizes sampling bias and ensures that the findings accurately represent the actual conditions within the unit. All nurses included in the study were directly involved in hemodialysis services and had experienced the hospital's human resource development programs.

Data Analysis Methods

Data analysis was conducted using descriptive statistics and multiple linear regression analysis. Descriptive analysis was used to present an overview of respondents' characteristics and their perceptions of each research variable. The results were presented in the form of frequency distributions, percentages, means, and standard deviations to describe general trends and response patterns. Before performing regression analysis, classical assumption tests were conducted, including normality, multicollinearity, and heteroscedasticity tests, to ensure that the regression model met statistical requirements. Multiple linear regression analysis was then applied to examine the simultaneous and partial effects of the independent variables on nurses' performance.

Where Y represents nurses' performance; X_1 represents training and development; X_2 represents education and learning; X_3 represents performance management; X_4 represents career development; b_0 is the constant; b_1–b_4 are regression coefficients; and e is the error term. Hypothesis testing was conducted using the F-test to examine the simultaneous influence of all independent variables on the dependent variable, and the t-test to examine the partial influence of each independent variable. The coefficient of correlation (R) was used to determine the strength of the relationship between variables, while the coefficient of determination (R^2) was used to measure the proportion of variance in nurses' performance explained by the independent variables. The results of these analyses provided the empirical basis for concluding

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whether human resource development significantly influences nurses' performance in the Hemodialysis Unit.

Result and Discussion

Table 1. below presents descriptive statistics for all variables used in this study

Statement	N	Minimum	Maximum	Mean	Std. Deviation
The hospital provides training programs.	31	2.00	5.00	3.8387	0.89803
The training materials provided are relevant to my job needs.	31	2.00	5.00	4.0000	0.96609
I participated in training with sufficient frequency over the past year.	31	1.00	5.00	3.6129	1.11587
The results of the training I attended are evaluated to determine effectiveness.	31	2.00	5.00	4.0000	0.85635
The training provided helps improve my work skills.	31	2.00	5.00	4.0000	0.77460
I have opportunities to pursue further formal education.	31	2.00	5.00	3.9355	0.99785
I participate in certified training or courses relevant to my profession.	31	2.00	5.00	3.8710	0.92166
I have easy access to nursing learning resources.	31	2.00	5.00	3.6774	0.90874
The knowledge gained from education/training can be applied in my work practice.	31	1.00	5.00	3.8387	1.00322
The hospital supports continuous learning activities for nurses.	31	2.00	5.00	4.1290	0.67042
My performance appraisal is conducted objectively by my supervisor.	31	2.00	5.00	4.0645	0.81386
I receive regular feedback from my supervisor regarding my work performance.	31	1.00	5.00	3.8387	0.89803
Performance evaluations are conducted periodically in my unit.	31	2.00	5.00	3.9032	0.83086
Performance evaluation results are used to improve service quality.	31	2.00	5.00	4.0645	0.92864
I understand the performance appraisal criteria used by the hospital.	31	1.00	5.00	3.8387	1.00322
I have a clear career plan within this hospital.	31	2.00	5.00	4.1290	0.76341
The hospital provides open promotion opportunities for high-performing nurses.	31	2.00	5.00	3.7097	0.90161

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The institution supports my career development.	31	2.00	5.00	3.7097	0.97275
I am satisfied with my career progress so far.	31	2.00	5.00	3.8387	0.86011
I am aware of the available career pathways in the nursing profession.	31	2.00	5.00	3.7742	0.84497
I always strive to provide the highest quality nursing care.	31	1.00	5.00	3.9355	0.99785
I complete my tasks according to the established timelines.	31	2.00	5.00	4.2581	0.72882
I work in accordance with the applicable Standard Operating Procedures (SOP).	31	2.00	5.00	4.2258	0.76200
Patients are satisfied with the services I provide.	31	2.00	5.00	4.0968	0.83086
I continuously strive to improve my work outcomes over time.	31	2.00	5.00	4.1935	0.74919

Source: SPSS V 26.0 Data Processing Results, 2026

Based on descriptive analysis of 31 nurse respondents, nurses' perceptions of education and training, performance evaluation, career development, and nurse performance were found to be good. The average score for all indicators ranged from 3.61 to 4.26, indicating a tendency for respondents to give positive assessments. Regarding education and training, nurses assessed that the hospital provided training relevant to job needs and supported continuous learning, although some respondents felt the frequency of training in the past year was still suboptimal. Performance evaluation also showed good results, with performance assessments deemed objective, conducted periodically, and utilized to improve service quality. However, understanding of performance assessment criteria still needs to be improved.

Furthermore, regarding career development, nurses tended to have clear career plans and understood available career paths. However, promotion opportunities and institutional support for career development still needed to be strengthened. Meanwhile, in terms of performance, nurses demonstrated high work discipline, adherence to standard operating procedures, and a commitment to providing the highest quality nursing care, as reflected in high patient satisfaction with the services provided. In general, nurses' perceptions of education and training, performance evaluation, career development, and nurse performance were in the good category, with the average rating showing a positive trend. The hospital was assessed as supporting the improvement of nurses' competency and performance through training, objective and regular performance evaluations, and clear career paths. However, several aspects still needed improvement, particularly the frequency of training, understanding of performance evaluation criteria, and career development opportunities and support. Nevertheless, nurses demonstrated high performance, good work discipline, adherence to standard operating procedures, and a commitment to providing quality nursing care, which impacted patient satisfaction.

Table 2. Validity Test Results

Statement	Corrected Item-Total Correlation
The hospital provides training programs.	0.610

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The training materials provided are relevant to my job needs.	0.762
I participated in training with sufficient frequency over the past year.	0.582
The results of the training I attended are evaluated to determine effectiveness.	0.591
The training provided helps improve my work skills.	0.503
I have opportunities to pursue further formal education.	0.562
I participate in certified training or courses relevant to my profession.	0.618
I have easy access to nursing learning resources.	0.716
The knowledge gained from education/training can be applied in my work practice.	0.544
The hospital supports continuous learning activities for nurses.	0.683
My performance appraisal is conducted objectively by my supervisor.	0.689
I receive regular feedback from my supervisor regarding my work performance.	0.356
Performance evaluations are conducted periodically in my unit.	0.611
Performance evaluation results are used to improve service quality.	0.776
I understand the performance appraisal criteria used by the hospital.	0.586
I have a clear career plan within this hospital.	0.472
The hospital provides open promotion opportunities for high-performing nurses.	0.538
The institution supports my career development.	0.732
I am satisfied with my career progress so far.	0.631
I am aware of the available career pathways in the nursing profession.	0.685
I always strive to provide the highest quality nursing care.	0.510
I complete my tasks according to the established timelines.	0.634
I work in accordance with the applicable Standard Operating Procedures (SOP).	0.688
Patients are satisfied with the services I provide.	0.193
I continuously strive to improve my work outcomes over time.	0.409

Source: SPSS V 26.0 Data Processing Results, 2026

Syaifuddin Azwar (1997) and Sugiyono (2005) in Pieter (2008) state that a questionnaire item can be considered valid if the Corrected Item-Total Correlation has a critical value of >0.3 or 30%. Thus, items with a correlation of >30% are categorized as valid, while items with a correlation of <30% are categorized as invalid and will be excluded from further analysis. The analysis results in Table 4.5 show that all correlation coefficients are above 30% or 0.30 (critical), thus the model used can be considered valid for development.

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Table 3. Indicators of hospitals providing training

Score	Frequency	Percentage (%)
2	4	12.9
3	3	9.7
4	18	58.1
5	6	19.4
Total	**31**	**100**

Source: SPSS V 26.0 Data Processing Results, 2026

The majority of respondents agreed (58.1%) and strongly agreed (19.4%) that the hospital provides training for nurses in the Hemodialysis Unit. This indicates that the institution has fulfilled its role in human resource development by providing training programs. However, 22.6% of respondents disagreed, indicating that the provision of training has not been fully felt equally by all nurses. Overall, the hospital has provided training, thus supporting human resource development, which has the potential to improve nurse performance.

Table 4. Indicators of training materials according to job needs

Score	Frequency	Percentage (%)
2	4	12.9
3	2	6.5
4	15	48.4
5	10	32.3
Total	**31**	**100**

Source: SPSS V 26.0 Data Processing Results, 2026

A total of 80.7% of respondents agreed or strongly agreed that the training materials were appropriate for their job requirements as hemodialysis nurses. This indicates that the training provided was relevant to the job requirements and job competencies. The percentage of respondents who disagreed was relatively small, thus concluding that the training materials were quite appropriate. The training materials were deemed relevant and on-target, contributing positively to improving nurses' work capabilities.

Table 5. Frequency of Participation in Training During the Past Year

Score	Frequency	Percentage (%)
1	1	3.2
2	5	16.1
3	6	19.4
4	12	38.7
5	7	22.6
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

The majority of respondents (61.3%) agreed and strongly agreed that they participated in training with sufficient frequency during the past year. This finding indicates the continuity of training programs implemented by RSUD Ratu Aji Putri Botung. However, several respondents perceived that training frequency was not yet optimal, suggesting the need for more equitable training opportunities. Overall, training frequency is considered adequate but still requires improvement to ensure equal access for all nurses.

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Table 6. Evaluation of Training Outcomes

Score	Frequency	Percentage (%)
2	2	6.5
3	5	16.1
4	15	48.4
5	9	29.0
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

A total of 77.4% of respondents agreed and strongly agreed that the training they attended was evaluated to determine its effectiveness. This demonstrates that the hospital not only organizes training programs but also evaluates them as part of its human resource development management. Such evaluation ensures that training activities have a tangible impact on improving nurses' performance. The evaluation process is therefore considered well implemented and supportive of HR development effectiveness.

Table 7. Training Improves Work Skills

Score	Frequency	Percentage (%)
2	2	6.5
3	3	9.7
4	19	61.3
5	7	22.6
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

Most respondents (83.9%) agreed and strongly agreed that the training provided helped improve their work skills. This indicates that training has a direct impact on nurses' competence and ability to perform their duties in the Hemodialysis Unit. Skill improvement contributes to better service quality and enhanced performance. Thus, training is proven effective in strengthening nurses' competencies.

Table 8. Opportunity to Pursue Further Formal Education

Score	Frequency	Percentage (%)
2	4	12.9
3	4	12.9
4	13	41.9
5	10	32.3
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

A total of 74.2% of respondents agreed and strongly agreed that they had opportunities to pursue further formal education. This suggests that the hospital provides opportunities for nurses to enhance their academic qualifications. However, 25.8% perceived limited access, indicating that such opportunities may not yet be evenly distributed. Overall, formal education opportunities are considered good and contribute positively to professional competence and performance.

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Table 9. Participation in Certified Training or Courses

Score	Frequency	Percentage (%)
2	3	9.7
3	6	19.4
4	14	45.2
5	8	25.8
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

Approximately 71.0% of respondents agreed and strongly agreed that they participated in certified training relevant to their profession. This indicates that nurses actively enhance their professional competence through formally recognized programs. Certified training plays an important role in strengthening professionalism and performance in the Hemodialysis Unit.

Table 10. Access to Nursing Learning Resources

Score	Frequency	Percentage (%)
2	5	16.1
3	4	12.9
4	18	58.1
5	4	12.9
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

Most respondents (71.0%) agreed and strongly agreed that they had easy access to nursing learning resources such as books, journals, clinical guidelines, and learning media. Adequate access enables nurses to update knowledge and improve service quality. Learning resource accessibility is therefore categorized as good.

Table 11. Application of Knowledge from Education and Training

Score	Frequency	Percentage (%)
1	1	3.2
2	2	6.5
3	6	19.4
4	14	45.2
5	8	25.8
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0, 2026

A total of 71.0% agreed and strongly agreed that knowledge gained from education and training could be applied in daily practice. This demonstrates alignment between HR development programs and actual service needs in the Hemodialysis Unit. Knowledge application directly supports performance improvement.

Table 12. Hospital Support for Continuous Learning

Score	Frequency	Percentage (%)
2	1	3.2
3	2	6.5
4	20	64.5

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5	8	25.8
Total	**31**	**100**

Source: Processed SPSS Output Version 26.0 (2026)

A very high proportion of respondents (90.3%) agreed and strongly agreed that the hospital supports continuous learning. This reflects strong institutional commitment to long-term HR development. Continuous learning support is categorized as very good and significantly contributes to improved performance.

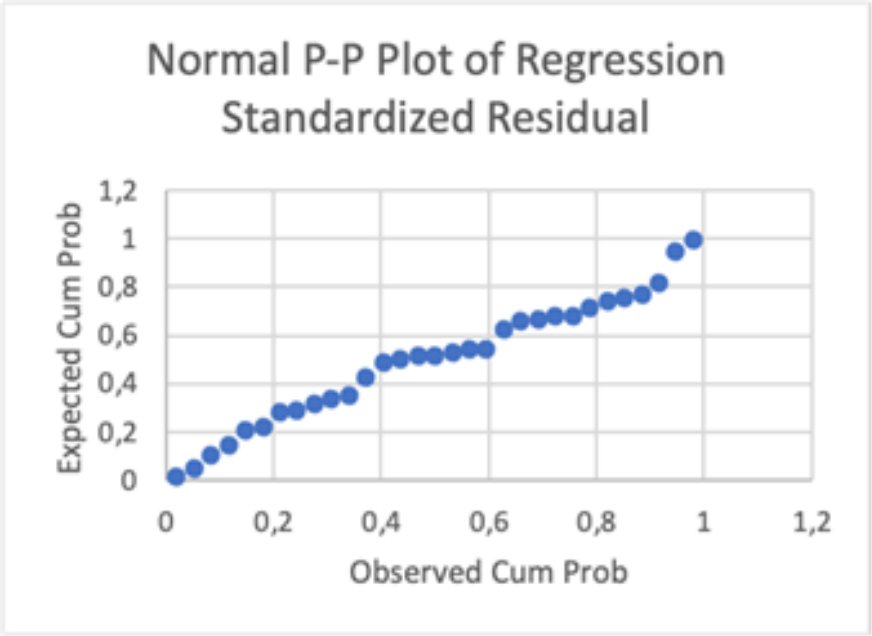


Figure 1. Normal P-P Plot of Regression Standardized Residual

By observing the normal P-P plot, it can be concluded that the graph displays a distribution pattern close to normal. The figure shows that the points are spread close to the diagonal line and around the diagonal line, indicating a normal distribution and a suitable regression model for use in this study.

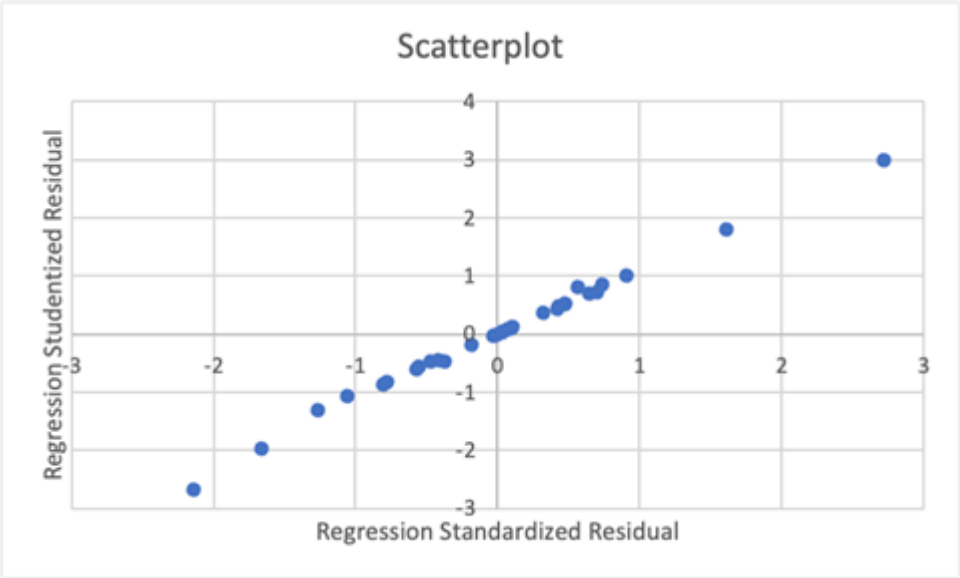


Figure 2. Scatterplot

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In Figure 2. above, no clear pattern appears to be formed, and the points are spread above and below the 0 mark on the Y-axis. Therefore, it can be concluded that heteroscedasticity does not occur.

Table 13. Reliability Test Results

Statement Item	Cronbach's Alpha if Item Deleted
The hospital provides training programs.	0.932
The training materials provided are relevant to my job needs.	0.930
I participated in training with sufficient frequency during the past year.	0.933
The outcomes of the training I attended are evaluated to determine their effectiveness.	0.932
The training provided helps improve my work skills.	0.933
I have the opportunity to pursue further formal education.	0.933
I participate in certified training or courses relevant to my profession.	0.932
I have easy access to nursing learning resources.	0.930
The knowledge gained from education/training can be applied in my work practice.	0.933
The hospital supports continuous learning activities for nurses.	0.932
My performance appraisal is conducted objectively by my supervisor.	0.931
I regularly receive feedback from my supervisor regarding my work performance.	0.936
Performance evaluations are conducted periodically in my unit.	0.932
The results of performance evaluations are used to improve the quality of my service.	0.929
I understand the performance appraisal criteria used by the hospital.	0.932
I have a clear career plan within this hospital.	0.934
The hospital provides open promotion opportunities for high-performing nurses.	0.933
The institution supports my career de	

Table 14. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.723	0.523	0.450	1.70994	2.252

Source: SPSS V 26.0 Data Processing, 2026

Based on the results of multiple linear regression analysis, the Adjusted R Square value is 0.450. This indicates that, after adjusting for the number of independent variables in the model namely career development, performance management, education and learning, and training and development approximately 45.0% of the variation in nurse performance at the Hemodialysis Unit of RSUD Ratu Aji Putri Botung, Penajam Paser Utara, can be significantly

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explained by human resource development variables. Meanwhile, the remaining 55.0% of performance variation is influenced by other factors outside this study, such as work environment conditions, leadership, motivation, workload, and individual nurse characteristics, which are not included in the research model.

Table 15. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	83.398	4	20.850	7.131	<0.001
Residual	76.021	26	2.924	-	-
Total	159.419	30	-	-	-

Source: SPSS V 26.0 Data Processing, 2026

The simultaneous test results show a significance value of <0.001, which is smaller than the 0.05 threshold. This indicates that career development, performance management, education and learning, and training and development simultaneously have a significant effect on nurse performance. The F-value of 7.131 shows that the variation in nurse performance explained by the regression model is greater than the variation caused by error factors, making the regression model valid and reliable. These findings highlight that nurse performance is influenced by the synergy of multiple HR management aspects, rather than by a single factor alone. Therefore, improving nurse performance is more effective when the organization implements comprehensive and sustainable human resource development policies.

Table 16. Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
Constant	7.249	2.108	-	3.439
Training & Development	-0.139	0.234	-0.207	-0.595
Education & Learning	0.297	0.168	0.473	1.768
Performance Management	0.590	0.190	0.880	3.103
Career Development	-0.270	0.242	-0.379	-1.112

Source: SPSS V 26.0 Data Processing, 2026

The regression analysis indicates that of the four independent variables studied, only performance management has a significant effect on nurse performance. The positive regression coefficient (B = 0.590) and a significance value of 0.005 ($p < 0.05$) show that better performance management through clear work targets, an effective appraisal system, and regular feedback will significantly improve nurse performance. The standardized beta value of 0.880 also indicates that performance management is the most dominant factor influencing nurse performance compared to the other variables. In contrast, training and development does not significantly affect nurse performance ($p = 0.557$, B negative), suggesting that existing programs have not yet produced a direct impact on performance. Education and learning show a positive but not significant effect ($p = 0.089$), implying that while increased education may improve performance, its effect is statistically weak and possibly long-term. Career development also has no significant effect ($p = 0.276$, B negative), indicating that the current

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career development system has not been directly experienced as beneficial by nurses in enhancing work performance.

Training and Development Have a Significant Influence on Nurse Performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital

The results of the multiple regression analysis indicate that partially, Training and Development (X1) does not significantly influence nurse performance. This is indicated by a Sig. value of 0.557 (greater than 0.05), with a coefficient of B = -0.139, Beta = -0.207, and t = -0.595. This finding indicates that, after controlling for the influence of other variables (Education & Learning, Performance Management, and Career Development), training and development are not the primary determinants of nurse performance fluctuations in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital.

In an era of increasingly complex healthcare transformation, nurse performance is a key factor because nurses interact directly and intensively with patients. Therefore, service quality is highly determined by the competence, accuracy, and consistency of nursing care delivery (Asmara et al., 2025; Widyaningrum et al., 2025). This situation is even more pronounced in specialized units such as hemodialysis, which require high technical skills, physical and mental resilience, and therapeutic communication skills in assisting patients with chronic illnesses undergoing routine and long-term therapy (Darsini & Cahyono, 2023; Rahmasari & Supriyadi, 2023). Therefore, human resource development, including training and development, is theoretically considered relevant for increasing nurses' work capacity so that hemodialysis services remain safe, effective, and patient-oriented (Wulandari & Sumanti, 2022; Maulida et al., 2025).

Conceptually, this study positions Training and Development (X1) as part of human resource investment. In Human Capital Theory, training is understood as an investment that increases an individual's knowledge, skills, and productivity, thus supposedly impacting performance (Becker, 1964; Becker & Gary, 1993). Furthermore, through the Resource-Based View (RBV) lens, competent and continuously developed nurses are valuable strategic resources and can be a key advantage for hospital services if managed systematically (Barney, 1991; Khotimah, 2022; Rahmatullah et al., 2023; Aslamiyah et al., 2024). Therefore, in theory, training and development should positively contribute to nurse performance.

However, when this theory is confronted with the empirical context of the Hemodialysis Unit at Ratu Aji Putri Botung Regional Hospital, a dynamic emerges that requires discussion. The hemodialysis unit has high work complexity, strict procedures, and significant clinical risks. In this situation, performance improvement is influenced not only by the availability of training but also by how the training is translated into work behavior, adherence to SOPs, timeliness of procedures, and complication management skills in the practice room (Rahmasari & Supriyadi, 2023; Ayuningtyas & Wibowo, 2024). This means that available training does not necessarily automatically become the main determining factor, if work system factors, performance evaluation, supervision, and unit culture are more dominant in directing the daily performance of nurses.

Respondent characteristics support this argument. The respondents were predominantly female (87.1%), reflecting the characteristics of the nursing profession, which demands precision, empathy, and intensive communication, particularly with hemodialysis patients who are routinely and stress-prone (Asmara et al., 2025; Darsini & Cahyono, 2023). In terms of age, the majority were between 30 and 49 years (48.4% aged 30–39 and 41.9% aged 40–49), indicating a productive and relatively professionally mature workforce. Furthermore, the

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majority of respondents had tenure of 11–20 years (48.4%), indicating extensive clinical experience and the development of stable work habits. Under these circumstances, performance is often more influenced by experience, procedural routines, and the unit's performance control system than by variations in training received over a short period (Maulida, Yusuf, & Haryanto, 2025; Armstrong & Baron, 2004). When linked to descriptive analysis of the variables, the findings indicate that training was considered "good": the hospital provided training (77.5% agreed–strongly agreed), the material was relevant (80.7%), the training frequency was sufficient (61.3%), training evaluations were ongoing (77.4%), and the training helped improve skills (83.9%). Narratively, this indicates that training was available and its benefits were felt, so variable X1 did not experience the problem of "absence of a program." However, because respondents' assessments tended to be high (predominantly agree), the variation in responses was relatively narrow. In regression analysis, this condition often weakens the statistical influence of a variable due to small differences between respondents (low variance), making it difficult to demonstrate X1's unique contribution to performance changes when other variables are included simultaneously. Substantively, the insignificance of X1 can be explained by the highly procedural and strictly standardized nature of hemodialysis work. In such work settings, nurses' performance is heavily guided by standard operating procedures (SOPs), procedure schedules, clinical monitoring, and team coordination. If a performance management system is robust for example, objective evaluation, regular feedback, and the use of evaluation results for service improvement then performance will be more "locked in" by the unit's control and evaluation mechanisms than by the frequency of training. This aligns with the results that Performance Management (X3) is actually significant (Sig. = 0.005; B = 0.590; Beta = 0.880). In other words, when a hospital has an effective assessment and feedback system, the aspect of "strengthening work behavior" is more determined by performance management than by formal training alone (Armstrong & Baron, 2004).

Furthermore, descriptive findings on performance indicate good and very good categories: nurses strive to provide the best service (77.4% agree strongly agree), time discipline is very good (90.3%), SOP compliance is very good (87.1%), and continuous improvement is very good (87.1%). Training remains important for maintaining competency, but its contribution does not appear dominant because performance is already relatively established. When compared with previous research, these results indicate differences in scope. A study by Wulandari & Rizky (2024) found that education and training significantly influenced the performance of inpatient nurses, while research by Rarasati et al. (2016) showed that training and development influenced performance both directly and indirectly through motivation. This difference in results can be explained because inpatient units have a wider variety of cases and service dynamics, making training more readily a differentiator of ability; while hemodialysis units tend to be more routine, repetitive, and highly standardized, so stronger performance differences come from process control, evaluation, and supervision (Rahmasari & Supriyadi, 2023; Armstrong & Baron, 2004). Furthermore, several studies have placed motivation or competence as mediating variables (Rarasati et al., 2016; Chamariyah et al., 2023).

Thus, the results of this study do not necessarily deny the importance of training and development, but rather indicate that the training provided likely functions more as a means of maintaining competency than as a key differentiator in performance. From a Human Capital perspective, training investments can still result in increased capacity, but their impact on performance indicators may depend on whether the hospital provides post-training reinforcement mechanisms such as coaching, monitoring the implementation of training outcomes, and integrating training materials into performance assessment indicators (Becker, 1964; Becker & Gary, 1993; Armstrong & Baron, 2004). From a RBV perspective, training

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only becomes a source of advantage if it is truly orchestrated into a unique capability, rather than simply a routine activity disconnected from performance systems and competency levels (Barney, 1991; Rahmatullah et al., 2023).

The practical implication of these findings is the need to reposition training: not only ensuring that training is available and relevant, but also ensuring that training has "leverage" on performance. This can be done, for example, through competency gap-based training needs mapping, post-training standardization (competency tests/skill checks), evaluation of training transfer to practice (observation of procedural and safety compliance), and linking training outcomes to performance management systems and performance rewards. These efforts are crucial to ensure that training does not stop at increasing knowledge but actually changes work behavior and the outcomes of safe and high-quality hemodialysis services (Armstrong & Baron, 2004; Wulandari & Sumanti, 2022). Based on all the descriptions, the conclusion of the discussion for variable X1 is: Training and Development does not have a significant partial effect on Nurse Performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital, as evidenced by a Sig. 0.557 (>0.05). These findings indicate that within a standardized hemodialysis unit dominated by experienced nurses, performance variation is explained more by performance management and control mechanisms (performance management) than by training itself, although training remains important as a strategy for maintaining competence and patient safety (Darsini & Cahyono, 2023; Rahmasari & Supriyadi, 2023; Armstrong & Baron, 2004).

Education and Learning Have a Significant Influence on Nurse Performance

Education and Learning (X2) did not have a significant partial effect on nurse performance in the Hemodialysis Unit at Ratu Aji Putri Botung Regional Hospital, as indicated by a Sig. 0.089 (>0.05). However, the positive coefficient indicates that education and learning still have the potential to improve performance, especially when supported by strengthening organizational systems and performance management mechanisms that ensure the transfer of knowledge into work behavior and service quality. Within the hemodialysis unit, the demands of routine, invasive, and high-risk services require nurses to have strong clinical knowledge, a consistent understanding of standard operating procedures (SOPs), and the ability to make quick decisions when complications arise during dialysis. This complexity emphasizes that increasing nurse capacity is not sufficient based on work experience alone; it also requires continuous education and learning to ensure clinical competency remains aligned with developments in practice standards, hemodialysis machine technology, and patient safety (Darsini & Cahyono, 2023; Rahmasari & Supriyadi, 2023; Ayuningtyas & Wibowo, 2024).

Theoretically, the Education and Learning variable (X2) represents investments in increasing knowledge and professionalism through formal and non-formal education. Within the Human Capital approach, education is viewed as an investment that improves the quality of human capital in the form of knowledge, skills, and competencies, thereby boosting individual productivity and performance. This means that the greater the access and intensity of learning, the greater the opportunity for nurses to improve the accuracy of their actions, the quality of therapeutic communication, and adherence to service procedures (Becker, 1964; Becker & Gary, 1993; Saks & Haccoun, 2010).

Furthermore, from a Resource-Based View (RBV) perspective, nurses' intellectual capacity and clinical competency are valuable and difficult-to-imitate intangible resources that can become a hospital service advantage if consistently developed. Structured education and learning help hospitals build internal capabilities (nurse competencies) that support the quality of hemodialysis services on an ongoing basis. Thus, conceptually, X2 is indeed relevant as a

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factor that should influence performance (Barney, 1991; Khotimah, 2022; Rahmatullah et al., 2023; Aslamiyah et al., 2024). However, when tested empirically through multiple linear regression, statistical results showed that Education and Learning (X2) did not have a significant partial effect on nurse performance. This is evident from the Sig. value = 0.089 (> 0.05) with a coefficient of B = 0.297 and Beta = 0.473, and t = 1.768. These results indicate that the direction of X2's influence on performance is positive (better education/learning tends to improve performance), but it is not statistically strong enough at the 5% significance level after controlling for other variables in the model (X1, X3, X4). Therefore, the hypothesis "X2 has a significant effect" is not proven at $\alpha = 0.05$, although there is a tendency for a positive effect approaching significance (Saks & Haccoun, 2010; Armstrong & Baron, 2004).

This positive but insignificant trend can be explained by the characteristics of the respondents and the scope of their organization. Respondents were predominantly female (87.1%), who tend to demonstrate empathy, thoroughness, and intensive communication in nursing practice; while the dominant age group of 30–49 years and the dominant length of service of 11–20 years indicate a relatively mature and experienced nursing workforce. Under these conditions, daily performance in highly procedural units such as hemodialysis is often determined more by work habits, adherence to SOPs, and routine monitoring and evaluation systems, rather than solely variations in education/learning within a given period. (Asmara et al., 2025; Rahmasari & Supriyadi, 2023; Maulida et al., 2025).

Furthermore, respondents' educational characteristics also show a predominance of Diploma/D3 (71%) compared to Bachelor's (29%). This composition indicates an imbalance in education levels, but simultaneously, it can cause the contribution of formal education to performance to be less pronounced if operational performance is more determined by uniform standards of practice and unit supervision. In other words, although higher education can broaden clinical knowledge, in hemodialysis practice with strict SOPs, performance differences between education levels can be minimized because all procedures follow the same protocols (Darsini & Cahyono, 2023; Wulandari & Sumanti, 2022).

When linked to descriptive analysis of variables related to education and learning, the results indicate good to excellent ratings, for example, opportunities for further study (74.2% agree–strongly agree), participation in certified courses (71.0%), access to learning resources (71.0%), application of knowledge gained from education/training (71.0%), and very high levels of support for continuous learning (90.3%). These findings indicate that the organizational environment is relatively supportive of learning. However, the predominance of "agree" responses can also cause narrow variation in the X2 data (low variance), making it difficult for X2's contribution to emerge significantly in the regression model because differences in perceptions between respondents are not significant (Saks & Haccoun, 2010; Becker, 1964).

Comparison with previous research also helps clarify the position of these findings. Chamariyah et al.'s (2023) study found that education significantly influenced nurse performance, but through or in conjunction with competency as an important pathway. Hardiansah et al. (2024) also emphasized that continuing education increases competency and satisfaction. This means that in many studies, the effect of education is more likely to emerge when it is linked to competency (as a mediator) or when the organizational context allows for greater practice variation. In this study, because the hemodialysis unit is highly standardized and the performance management variable is so strong, the contribution of X2 is not directly significant, although it is positive (Chamariyah et al., 2023; Hardiansah et al., 2024; Indriasari et al., 2023; Rahmasari & Supriyadi, 2023).

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Thus, this discussion shows that the Education and Learning variable (X2) is theoretically important and empirically shows a positive trend. However, based on partial regression tests, it is not significant at $\alpha = 0.05$. These results indicate that improving education and learning plays a more significant role in strengthening long-term competencies and can have a more tangible impact on performance.

Performance Management Has a Significant Influence on Nurse Performance

The Performance Management variable (X3) was shown to have a significant partial influence on nurse performance, as indicated by a Sig. value of 0.005 (<0.05) and a t-value of 3.103. The B coefficient of 0.590 indicates that every one-unit increase in performance management will increase nurse performance by 0.590 units (with other variables held constant). Furthermore, the Beta value of 0.880 indicates that X3 is the most dominant predictor compared to other variables in the model. These results indicate that strengthening the performance assessment, evaluation, and feedback system is a key factor in improving nurse performance in the Hemodialysis Unit at Ratu Aji Putri Botung Regional Hospital (Armstrong & Baron, 2004).

This significant finding also aligns with respondents' descriptive descriptions of performance management practices in the unit. The majority of respondents stated that performance assessments were objective (77.5%), received regular feedback (74.2%), evaluations were conducted periodically (80.7%), evaluation results were used to improve service quality (80.7%), and respondents understood the assessment criteria (77.4%). This pattern indicates that performance management in the unit is running quite well and is perceived as tangible by nurses. When such a system is robust, it can guide daily work behaviors such as punctuality, adherence to standard operating procedures, and continuous improvement—all important indicators of nurse performance, particularly in hemodialysis services that demand procedural consistency. (Armstrong & Baron, 2004; Rahmasari & Supriyadi, 2023)

In hemodialysis units, the demands of high-risk and repetitive services mean that nurse performance is determined not only by technical ability but also by consistency in carrying out procedures, timely interventions, and preparedness for emergencies. Intensive interactions with chronically ill patients also require emotional stability and effective therapeutic communication. Therefore, hospitals need a system that ensures nurses' work behavior remains aligned with service standards and patient safety, rather than relying solely on individual experience. This situation explains why performance management is crucial as a quality control mechanism for services in hemodialysis units. (Rahmasari & Supriyadi, 2023; Darsini & Cahyono, 2023; Ayuningtyas & Wibowo, 2024)

Conceptually, Performance Management (X3) in this study refers to competency-based evaluation, providing feedback, and using assessment results for continuous improvement. Armstrong & Baron (2004) emphasize that performance management is not merely an administrative assessment, but a process that directs work behavior through standard setting, monitoring, evaluation, and reinforcement (feedback) to achieve organizational goals. In other words, performance management bridges the gap between nurses' "abilities" and the "work behaviors" required to consistently deliver high performance (Armstrong & Baron, 2004).

In relation to Human Capital Theory, performance management plays a role in ensuring that investments in training, education, and work experience actually result in visible productivity. Human capital does not automatically improve performance if there is no system in place to assess, direct, and reinforce the application of competencies in daily work. With regular evaluation and feedback, nurses' knowledge and skills can be translated into more effective and efficient work output. (Becker, 1964; Becker & Gary, 1993). Furthermore, from a Resource-

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Based View (RBV) perspective, superior human resources can become a source of competitive advantage for hospitals if managed through an organizational system that effectively exploits internal potential. Performance management is a form of "organizational capability" that makes human resources (nurses) more valuable because their performance is directed, consistent, and measurable. Thus, the influence of performance management on nurse performance is not only logical but also strategic for building sustainable service quality. (Barney, 1991; Khotimah, 2022; Rahmatullah et al., 2023; Aslamiyah et al., 2024).

The strong influence of performance management is also relevant when linked to respondent characteristics. The majority of nurses are of productive and mature age (dominantly 30–49 years old) and have long tenure (11–20 years is the most common). In this relatively experienced workforce, the most effective intervention to boost performance is often not "increasing basic knowledge," but rather ensuring standardized discipline, consistent monitoring, and structured feedback to ensure stable work quality and adaptability to service demands. Thus, a performance management system becomes a "driver" that ensures long work experience continues to produce optimal performance, rather than stagnant routines (Maulida, Yusuf, & Haryanto, 2025; Armstrong & Baron, 2004).

These results align with the findings of Anggraeni et al. (2021), which show that aspects of performance planning, assessment, and evaluation significantly influence employee productivity and support the view that performance management components are drivers of work achievement. Furthermore, several HR studies in other sectors also confirm that organizational mechanisms (e.g., organizational change and learning) can be important determinants of employee performance (Sasono, 2020). This relevance demonstrates that in public service organizations such as hospitals, particularly in specialized service units, a robust performance management system is a crucial instrument for maintaining service quality and patient safety (Anggraeni et al., 2021; Sasono, 2020; Armstrong & Baron, 2004).

Thus, the results of this study confirm that performance management is a strategic instrument for Ratu Aji Putri Botung Regional Hospital to improve and maintain the performance of hemodialysis nurses. Consistent implementation of performance management through objective assessments, routine feedback, periodic evaluations, and the use of evaluation results for service improvement will encourage more disciplined work behavior, adherence to procedures, and a focus on patient safety. Practical implications: hospitals need to maintain and even strengthen this system, for example by clarifying competency-based indicators, strengthening coaching by superiors, and ensuring follow-up on evaluation results (e.g., individual and unit improvement plans) (Armstrong & Baron, 2004; Barney, 1991).

Based on this description, it can be concluded that the research hypothesis is accepted, namely that Performance Management (X3) has a significant effect on Nurse Performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital. This is evidenced by a Sig. value of 0.005 (<0.05) and a positive coefficient (B = 0.590; Beta = 0.880), indicating that the better the implementation of performance management, the higher the nurse performance (Armstrong & Baron, 2004; Anggraeni et al., 2021).

Career Development Has a Significant Influence on Nurse Performance

The hypothesis "Career Development (X4) has a significant influence on nurse performance" was not proven in this study. This is evidenced by a Sig. 0.276 (>0.05) and t = -1.112, indicating that partially, career development does not have a significant influence on the performance of nurses in the Hemodialysis Unit at Ratu Aji Putri Botung Regional Hospital. Nevertheless, in practice, career development remains important as a strategy to increase nurse satisfaction and

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maintain the continuity of professionalism. However, its influence on performance is likely indirect or requires an analysis design with mediator variables (e.g., motivation and job satisfaction) to more clearly understand the mechanism of influence (Bratton & Gold, 2017; Balbed & Sintaasih, 2019; Wahyudi et al., 2021).

In hemodialysis units, the complex, procedural, and high-risk work demands mean that nurses' performance is highly dependent on precision, adherence to standard operating procedures (SOPs), timely interventions, and consistent service delivery when dealing with chronic patients who routinely visit 2–3 times per week. This framework emphasizes that human resource management relies not only on improving technical competency but also on factors that foster long-term motivation and commitment, one of which is career development. Career development is theoretically seen as strengthening nurse engagement, increasing work morale, and ultimately impacting service performance (Darsini & Cahyono, 2023; Rahmasari & Supriyadi, 2023; Ayuningtyas & Wibowo, 2024).

In this study, Career Development (X4) refers to the availability of career paths, promotion opportunities, institutional support, and nurse satisfaction with their career development. Bratton & Gold (2017) explain that career development is a systematic process to facilitate individual growth through career planning, competency development, and career advancement opportunities, thus impacting employee motivation and retention. Ideally, when nurses perceive a clear and fair career path, they tend to improve their performance due to the expectation of non-financial rewards (position status, recognition, and development opportunities) that accompany their work performance. (Bratton & Gold, 2017)

Specifically, this was achieved through respondent characteristics. The majority of respondents were aged 30–49, with a majority having 11–20 years of service. In this group of nurses with relatively established experience, performance is often more influenced by standard work routines, daily operational demands, and control mechanisms such as evaluation and feedback, rather than by long-term incentives such as career paths. In other words, long experience can maintain stable performance because "work competencies have already been established," making the impact of career development indirect and difficult to detect partially in regressions. (Maulida, Yusuf, & Haryanto, 2025; Armstrong & Baron, 2004)

Furthermore, the composition of employment status, dominated by civil servants (PNS/ASN/PPPK), may also explain why career development appears insignificant. In relatively stable staffing systems, career advancement is often heavily influenced by structural and administrative mechanisms (job formation, credit points, regulations) that are not always directly linked to daily work performance in the unit. Consequently, nurses may maintain high performance due to the demands of SOPs and patient care, even though the perception of career advancement is not particularly strong. This situation makes career development more of a factor in long-term retention and satisfaction, rather than a direct driver of performance indicators measured in research (e.g., punctuality, SOP compliance, service quality) (Bratton & Gold, 2017; Rahmasari & Supriyadi, 2023).

Simultaneous Human Resource Development Affects Nurse Performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital

The ANOVA results ($F = 7.131$; Sig. < 0.001) confirmed that simultaneous Human Resource Development (X1, X2, X3, X4) significantly influenced nurse performance in the Hemodialysis Unit of Ratu Aji Putri Botung Regional Hospital. This finding indicates that improving the performance of hemodialysis nurses will be more effective if the hospital implements human resource development as an integrated system: training and

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education/learning to strengthen competencies, performance management to ensure standards implementation and continuous improvement, and career development to maintain nurse motivation and sustainable contributions. Therefore, simultaneously strengthening human resource policies is a crucial strategy for maintaining consistent hemodialysis service quality (Noe, 2020; Saks & Haccoun, 2010; Armstrong & Baron, 2004; Bratton & Gold, 2017; Becker, 1964; Barney, 1991).

In an era of increasingly complex healthcare transformation, hospitals are required to maintain service quality by strengthening human resource performance, particularly nurses, who serve as the spearhead of service and interact directly with patients. Nurse performance becomes even more crucial in specialized care units such as hemodialysis, as this service is high-risk, repetitive, requires procedural precision, and demands communication skills and psychological support for patients with chronic kidney disease undergoing long-term therapy. Given these work characteristics, improving service quality cannot be achieved through a single development program; it requires planned and integrated human resource development to ensure nurse performance remains consistent and meets standards (Darsini & Cahyono, 2023; Rahmasari & Supriyadi, 2023; Ayuningtyas & Wibowo, 2024).

In line with these needs, this study views human resource development as a system measured through four main dimensions: training and development (X1) to strengthen job skills (Noe, 2020), education and learning (X2) to enhance professionalism through knowledge enhancement and continuous learning (Saks & Haccoun, 2010), performance management (X3) through competency-based evaluation and ongoing feedback (Armstrong & Baron, 2004), and career development (X4) through advancement, promotion, and retention (Bratton & Gold, 2017). These four dimensions are interrelated: training and education build capacity, performance management ensures that capacity is utilized according to standards, while career development maintains motivation, commitment, and sustainable performance (Maulida et al., 2025; Wulandari & Sumanti, 2022).

These simultaneous findings are reinforced by descriptive variable results, which indicate that the implementation of human resource development at Ratu Aji Putri Botung Regional Hospital is generally rated good to excellent. Regarding training, the majority of respondents stated that the hospital provided training, provided training materials that met needs, provided sufficient training frequency, evaluated training outcomes, and improved job skills. This illustrates the process of increasing technical and non-technical capacity relevant to the work demands of hemodialysis nurses (Noe, 2020; Darsini & Cahyono, 2023). Furthermore, regarding education and learning, respondents rated opportunities for further study, participation in certified training, access to learning resources, application of knowledge gained from training/education in work practice, and continuous learning support from the hospital quite highly. This indicates that the organization has provided a learning ecosystem that allows nurses to update their knowledge and improve their professionalism. In hemodialysis services, where procedures are stringent and technology is constantly evolving, continuous learning is a crucial factor in maintaining the quality of care and patient safety (Saks & Haccoun, 2010; Ayuningtyas & Wibowo, 2024).

Regarding performance management, most respondents stated that performance assessments are objective, with regular feedback and periodic evaluations, and that evaluation results are used to improve service quality. This demonstrates that human resource development does not stop at competency development but is also accompanied by continuous control and improvement mechanisms. In specialized services such as hemodialysis, evaluation and feedback are crucial because nurse performance is assessed not only by work speed but also by

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procedural accuracy, SOP adherence, and the quality of therapeutic communication. (Armstrong & Baron, 2004; Wulandari & Sumanti, 2022).

Meanwhile, regarding career development, respondents rated the clarity of career plans, promotion opportunities for high-performing nurses, institutional support, satisfaction with career development, and understanding of career paths as quite good. This indicates a career orientation that can maintain nurse motivation and retention. However, in regional hospitals, career development often faces implementation challenges such as limited ranks, promotion quotas, or equitable access. Therefore, its strongest impact often occurs when combined with training, education, and performance management as a single HR policy package (Bratton & Gold, 2017; Maulida et al., 2025).

This is consistent with Human Capital Theory, which states that organizational investment in education, training, and individual development will increase productivity and performance. Within the scope of this research, the simultaneous influence indicates that HR investments do not stand alone but are mutually reinforcing: learning and training enhance knowledge/skills, performance management directs and controls their implementation, while career development maintains long-term commitment. Thus, HR development as an "investment package" has been shown to contribute to the performance of hemodialysis nurses. (Becker, 1964; Becker & Gary, 1993).

This finding also aligns with the Resource-Based View (RBV), which emphasizes that internal resources, especially superior human resources, become a sustainable competitive advantage if valued and managed effectively. Competent and experienced hemodialysis nurses are a difficult resource to imitate; however, to truly become an organizational advantage, hospitals need to organize and strengthen them through training, learning, performance management systems, and career development. Simultaneous significance in ANOVA indicates that integrated human resource management strengthens the hospital's internal capabilities in maintaining the quality of hemodialysis services (Barney, 1991; Aslamiyah et al., 2024; Khotimah, 2022; Rahmatullah et al., 2023). Wulandari & Rizky (2024) demonstrated that education and training significantly influence nurse performance, while Rarasati et al. (2016) explained that the influence of training and development can operate through other mechanisms such as motivation. Chamariyah et al. (2023) and Hardiansah et al. (2024) emphasized the role of continuous learning education in improving competency and service quality. Regarding performance management, Anggraeni et al. (2021) demonstrated that performance assessment and evaluation components can impact productivity. This means that the literature supports that the more integrated the human resource development components are, the stronger the impact on work output. (Wulandari & Rizky, 2024; Rarasati et al., 2016; Chamariyah et al., 2023; Hardiansah et al., 2024; Anggraeni et al., 2021).

Conclusion

Training and Development did not have a significant partial effect on nurse performance. This finding suggests that in the context of a highly standardized Hemodialysis Unit dominated by experienced nurses, training serves more as a means of maintaining competency than as a primary performance differentiator. Variations in nurse performance are more influenced by the work management and control system than by the intensity of training. Education and Learning did not have a significant partial effect on nurse performance. Although the direction of the regression coefficient indicates a positive relationship, the effect is not statistically strong enough. This indicates that education and learning have the potential to improve performance. However, in the highly procedural practice of hemodialysis, performance is more determined by adherence to SOPs, work experience, and routine evaluation systems than by variations in

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formal education or learning received. Performance Management had a significant partial effect on nurse performance.

This finding confirms that an objective performance appraisal system, regular evaluations, and consistent feedback are key factors in improving and maintaining nurse performance in the Hemodialysis Unit. In a unit with high clinical risk and strict procedural standards, control mechanisms and reinforcement of work behavior through performance management have proven to be key determinants of performance. Career development did not have a significant partial effect on nurse performance. This may be due to the characteristics of respondents, who were mostly experienced and had relatively stable employment statuses. Therefore, performance was more influenced by operational demands and the unit's control system than by perceptions of career progression. Career development likely plays a greater role in increasing motivation and long-term retention than directly influencing operational performance. Simultaneously, the variables Training and Development, Education and Learning, Performance Management, and Career Development significantly influenced nurse performance. This indicates that nurse performance in the Hemodialysis Unit is not shaped by a single factor, but rather by a combination of integrated HR development policies. Although only Performance Management was significant partially, collectively, all four HR development variables contributed to improved performance.

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