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The impact of structured clinical supervision on nurses' adherence to nutritional education protocols for cardiac inpatients: A quasi-experimental study

Dampak supervisi klinis terstruktur terhadap kepatuhan perawat dalam penerapan protokol edukasi nutrisi pada pasien rawat inap jantung: Studi Kuasi-Eksperimental

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Abstract

Nutritional education is crucial for managing cardiovascular diseases; however, nurses' adherence to established protocols remains suboptimal. This study aimed to evaluate the effectiveness of clinical supervision in improving nurses' compliance with providing nutritional education to hospitalized cardiac patients. A quasi-experimental pre–post design was applied, involving 38 nurses working in the cardiac ward of a Type B General Hospital in Riau Province, from March to May 2024. The intervention group received structured clinical supervision for four weeks, while the control group continued with the standard procedures. Compliance was measured using validated observation and self-report instruments. Data were analyzed using paired t-tests and ANCOVA. Results showed that. The mean compliance score in the intervention group increased from 68,4 (SD = 8,7) to 88,2 (SD = 6,3) ($p < 0,001$), whereas no significant change was observed in the control group. ANCOVA confirmed that clinical supervision had a significant effect on compliance ($F = 11,23$, $p = 0,002$), with a large effect size ($\eta^2 = 0,24$). In conclusion, clinical supervision effectively improved nurses' compliance in providing nutritional education. Integrating structured supervision into nursing management may enhance the quality of patient education and support better clinical outcomes in the future.

Keywords: Cardiovascular diseases, clinical supervision, nutritional education, patient compliance

Abstrak

Edukasi nutrisi memegang peran penting dalam penatalaksanaan penyakit kardiovaskular, namun tingkat kepatuhan perawat dalam melaksanakan protokol edukasi masih belum optimal. Penelitian ini bertujuan menilai efektivitas supervisi klinis dalam meningkatkan kepatuhan perawat memberikan edukasi nutrisi kepada pasien rawat inap dengan penyakit jantung. Desain penelitian menggunakan kuasi-eksperimen pre–post yang melibatkan 38 perawat di ruang rawat jantung Rumah Sakit Umum Tipe B Provinsi Riau pada Maret hingga Mei 2024. Kelompok intervensi memperoleh supervisi klinis terstruktur selama empat minggu, sedangkan kelompok kontrol tetap menjalankan prosedur standar. Kepatuhan diukur melalui lembar observasi dan instrumen swalapor yang telah tervalidasi. Analisis data dilakukan menggunakan uji t berpasangan dan ANCOVA. Hasil menunjukkan bahwa rata-rata skor kepatuhan kelompok intervensi meningkat dari 68,4 (SD = 8,7) menjadi 88,2 (SD = 6,3) ($p < 0,001$). Sementara itu, kelompok kontrol tidak mengalami perubahan signifikan. Analisis lanjutan dengan ANCOVA membuktikan adanya pengaruh signifikan supervisi klinis terhadap kepatuhan ($F = 11,23$, $p = 0,002$) dengan ukuran efek besar ($\eta^2 = 0,24$). Disimpulkan bahwa supervisi klinis efektif dalam meningkatkan kepatuhan perawat, sehingga integrasinya dalam manajemen

keperawatan berpotensi memperkuat kualitas edukasi nutrisi dan mendukung perbaikan luaran klinis pasien.

Kata Kunci: Edukasi Gizi, kepatuhan pasien, penyakit kardiovaskular, supervisi klinis

Introduction

Coronary heart disease (CHD) and other cardiovascular disorders are the leading causes of mortality worldwide, including in Indonesia. According to the World Health Organization (WHO, 2023), cardiovascular diseases account for approximately 17,9 million deaths annually, representing approximately 32% of all global deaths. In Indonesia, the 2023 report indicates an increasing prevalence of heart disease and hypertension among adults, contributing to a high economic burden, particularly from recurrent hospitalizations (Kemenkes RI, 2018; Iskandar, 2022).

The management of heart disease requires a comprehensive approach that extends beyond medical treatment to include lifestyle modifications and behavioral changes, particularly dietary adjustments (Mozaffarian, 2016; Riegel et al., 2017). Unhealthy eating patterns, such as excessive sodium and saturated fat intake combined with low fiber and antioxidant consumption, are major risk factors for disease progression (Stanner et al., 2019). Consequently, evidence-based nutritional education is a key intervention for preventing recurrence and improving long-term outcomes. Providing nutritional education during hospitalization is a critical opportunity to shape patients' understanding and adherence to the recommended dietary therapy (Greenlee et al., 2019). In this context, nurses serve as clinical communicators who bridge medical information with patients' daily behavior. Their role extends beyond delivering information to building therapeutic relationships and offering continuous support for behavioral changes (Traversi et al., 2021; Young et al., 2018).

However, studies have indicated that nurses' compliance in delivering nutritional education remains suboptimal. Ardiana et al. (2022) reported that only approximately 40% of nurses in cardiac wards consistently provided nutrition education in accordance with standard operating procedures (SOPs). The contributing factors include high workloads, time constraints, lack of specialized training, and insufficient monitoring or guidance from supervisors. This inconsistency hampers patients' understanding of dietary management and reduces the success of cardiac rehabilitation programs (Vanzella et al., 2021; Suwondo, 2023).

One managerial strategy to address this issue is the implementation of clinical supervision. Clinical supervision is a systematic process of professional guidance provided by supervisors or nurse managers to support nurses' practice (Ernawati et al., 2022; Cutcliffe et al., 2018). Unlike administrative oversight, clinical supervision incorporates reflective learning, performance feedback, competency development and problem-solving facilitation. According to Proctor's (1987) model, clinical supervision is effective when it fulfills three core functions: educational, supportive, and administrative. Evidence suggests that this model enhances accountability, professional competence, and quality of direct patient care (Kim & Lee, 2020).

Previous research has demonstrated that clinical supervision improves adherence to nursing procedures, interpersonal communication, and the application of evidence-based practices. For instance, Sérgio et al. (2023) found that structured clinical supervision significantly improved the documentation and implementation of educational interventions. However, studies specifically examining its impact on nurses' compliance in delivering nutritional education, particularly among hospitalized cardiac patients, remain scarce. This gap is critical because nutritional education requires cross-disciplinary skills, effective communication, and message consistency to ensure that patients can independently implement dietary changes after discharge (Andersen et al., 2019; Mogre et al., 2025).

Given the complexity of nurses' educational role and the importance of system-based interventions for improving service quality, this study aimed to evaluate the effectiveness of clinical supervision in enhancing nurses' compliance in providing nutritional education to hospitalized cardiac patients. The findings are expected to contribute to the development of structured nursing supervision models and support hospital accreditation standards in terms of service quality and patient safety.

Methods

Research Design

This study employed a quasi-experimental design with a non-equivalent control group pre- and post-test. The design was chosen to evaluate the effectiveness of clinical supervision in improving nurses' compliance with providing nutritional education to cardiac inpatients. This approach enabled a comparison of compliance level changes before and after the intervention in both the intervention and control groups (Maciejewski, 2020; White & Sabarwal, 2014).

Research Location and Time

The study was conducted in the cardiac inpatient ward of a type B general hospital in Riau Province, Indonesia from March to May 2024. The location was selected based on the availability of the target population and institutional support for clinical supervision implementation.

Population and Sample

The population consisted of all nurses working in the cardiac ward of the hospital. Purposive sampling was applied using the following inclusion criteria: (1) nurses with at least three months of continuous service in the ward, (2) willingness to participate in clinical supervision and evaluation, and (3) not undergoing external nursing training during the study period. A total of 38 nurses met the criteria and were allocated into two groups: 19 nurses in the intervention group and 19 in the control group.

Clinical Supervision Intervention

The intervention group participated in a structured four-week clinical supervision program led by the ward head and trained charge nurse. Supervision sessions were held weekly and included (1) direct observation of nutritional education delivery, (2) reflective feedback, and (3) brief case discussions on educational practices. The control group continued routine nursing care based on standard operating procedures, without additional supervision.

Instruments and Measurements

Nurse compliance was measured using two instruments: 1) An observation checklist based on standard operating procedures for nutrition education in cardiac care. This checklist comprises 10 items rated on a 4-point Likert scale, reflecting the level of implementation for each behavior. 2) A self-report questionnaire capturing the frequency of education delivery and nurses' perceived performance of educational duties in daily practice.

Content validity was established by three nursing experts in the field. Reliability testing indicated high internal consistency (Cronbach's alpha = 0,82 for the observation checklist and 0,85 for the self-report tool), confirming its suitability for data collection.

Data Collection Procedure

Pre-test data were collected one week before the intervention through direct observation and self-administered questionnaires. During the four-week intervention, trained independent observers who were not part of the supervision team recorded nurses' compliance using a validated observation checklist to minimize bias. Post-test data were collected for both groups immediately after the intervention using the same procedure as for the pre-test (Meyer et al., 2022).

Data Analysis Techniques

Data were analyzed using SPSS version 26.0. Paired t-tests were used to examine within-group differences between pre- and post-test compliance scores. ANCOVA was used to assess the effect of clinical supervision on nurses' compliance, controlling for baseline scores and demographic variables. The significance level was set at $\alpha = 0,05$ (Reddy et al., 2020).

Bias Control

As a quasi-experimental design was used, potential biases, such as selection and observer biases, were anticipated. To minimize selection bias, both the intervention and control groups were matched on key baseline characteristics, including years of experience, educational background, and shift patterns. Clear inclusion criteria were consistently applied during recruitment. To reduce observer bias, outcome assessments were conducted by trained independent observers who were not involved in the intervention. Standardized instruments and observation protocols were employed to maintain consistency across both groups.

Sample Size Justification

The sample size was estimated using G*Power 3,1, assuming a moderate effect size ($d = 0,5$), significance level (α) = 0,05, and statistical

power = 0,80 for paired comparisons. Calculations indicated that a minimum of 34 participants was required. Therefore, the total sample of 38 nurses (19 per group) met the minimum requirement to detect a statistically significant effect with sufficient power.

Research Ethics

This study was approved by the Health Research Ethics Committee of the Polytechnic of the Ministry of Health Riau, Indonesia (Approval No: 027/KEPK-PoltekkesRiau/II/2024). All participants provided written informed consent after being informed of the research objectives, benefits, procedures, and voluntary nature of participation. Data confidentiality and anonymity were maintained.

Result and Discussion

Respondent Characteristics

A total of 38 nurses were involved in the study, evenly divided into an intervention group (n=19) and a control group (n=19). The basic characteristics of the respondents included age, gender, education level, and length of work experience. The average age of the nurses was 30,8 years (SD = 4,5), with the majority being female (73,7%). Most of the respondents had a D3 Nursing education (65,8%) and had worked for more than five years (55,3%). The chi-square and t-tests showed no significant difference between the two groups in baseline characteristics ($p > 0,05$), indicating that the groups were equivalent at the start of the study.

Pre-test and Post-test Compliance Scores

The nurses' compliance score in providing nutrition education was measured at two times, namely before (pre-test) and after (post-test) the clinical supervision intervention. In the intervention group, there was an increase in the average score from 68,4 (SD = 8,7) in the pretest to 88,2 (SD = 6,3) in the post-test. The results of the paired t-test showed that this increase was statistically significant ($p < 0,001$), indicating that clinical supervision had a strong impact on improving nurses' adherence.

Table 1. Pre-test and post-test nurse compliance scores in intervention and control groups

Group	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Δ Score (Difference)	p-value
Intervention	68,4 ± 8,7	88,2 ± 6,3	+19,8	< 0,001
Control	69,1 ± 9,1	71,3 ± 7,8	+2,2	0,114

In contrast, in the control group, the average score only increased from 69,1 (SD = 9,1) to 71,3 (SD = 7,8). However, this increase was not statistically significant ($p = 0,114$), suggesting that without supervised intervention, changes in nurses' educational behavior did not occur meaningfully. These results reinforce the fact that clinical supervision is effective as a professional coaching intervention, which can significantly change the educational behavior of nurses compared to routine practice without supervision (El-Shemy et al., 2024).

The Effect of Clinical Supervision on Compliance

To obtain a more accurate picture of the effectiveness of clinical supervision interventions on nurses' adherence, a covariance analysis (ANCOVA) was performed by including pre-test scores and several covariate variables as controlling factors. In this case, the covariate variables considered included the age and length of work of the nurses, as both variables have the potential to affect the level of compliance independently of the intervention. By controlling for pre-test scores, this analysis aims to adjust the initial differences between groups so that the final results better reflect the pure influence of the given intervention (Chang, 2024).

The ANCOVA test results showed that clinical supervision interventions had a statistically significant effect on the improvement of nurses' compliance scores with standard operating procedures ($F = 11,23$; $p = 0,002$). This significance value ($p < 0,05$) indicates that the difference in compliance scores between groups is not due to mere coincidence but is a real effect of the implementation of clinical supervision. In addition, an adjusted R^2 value of 0,38 suggests that approximately 38% of the variation in compliance score changes can be explained by intervention models involving clinical supervision variables, age, and length of work. In other words, this model has a fairly good predictive power for explaining changes in

nurses' compliance behavior (Asante & Novak, 2024).

These findings reinforce the suspicion that a systematic and structured approach to clinical supervision can be an effective strategy for improving nurses' adherence to daily nursing practice. Supervision is conducted regularly and based on professional feedback, which not only strengthens the understanding of procedure standards but also encourages positive behavioral change through internal and external reinforcement. These results also imply the importance of considering individual factors such as age and work experience in designing training or supervision intervention programs so that the approach used is more contextual and adaptive to the characteristics of the nursing workforce (Khaleghparast et al., 2017).

Table 2. The Effect of clinical supervision on nurses' compliance controlling for pre-test, age, and work experience

Source of Variation	Number of Squares (SS)	Free Degree (df)	Middle Square (MS)	F Calculate	p-value
Pre-test	20,15	1	20,15	5,43	0,023
Age	11,67	1	11,67	3,15	0,081
Length of Work	8,72	1	8,72	2,35	0,131
Supervise Clinic	41,75	1	41,75	11,23	0,002**
Error (Residual)	121,60	33	3,68		
Total	204,80	37			

Adjusted R^2 = 0,38
Description: ** significant at α = 0,01

The results of the analysis showed that clinical supervision had a significant influence on the increase in nurse compliance scores, even after controlling for pre-test scores, age, and length of work, with a significance value of p = 0,002. Although the age and length of employment variables did not show statistical significance in the model, they were still considered important as control factors to ensure that the influence of clinic supervision was truly independent and not influenced by nurses' demographic characteristics. In addition, an adjusted R^2 value of 0,38 indicates that this model can explain a 38% variation in nurse compliance scores, which shows that the model's predictive power is quite good in the context of clinical supervision interventions.

The Dimension of Compliance That Has Seen the Greatest Improvement

Further analysis of the specific items in the compliance observation sheet showed that the dimensions of nurse compliance that experienced the highest improvement after the implementation of the clinical supervision intervention were found in three key aspects of educational nursing practice. First, there was an increase of 2,8 points in the average score of the ability of nurses to explain the relationship between the food consumed by the patient and the heart condition they suffered. Table 3 shows the mean compliance scores for each item in the intervention and control groups after the clinical supervision intervention.

Table 3. Comparison of nurses' compliance scores by item between intervention and control groups (Mean ± SD)

Item	Intervention (Mean ± SD)	Control (Mean ± SD)
Item 1	3,60 ± 0,42	3,10 ± 0,39
Item 2	3,47 ± 0,36	3,05 ± 0,41
Item 3	3,62 ± 0,40	3,09 ± 0,44
Item 4	3,52 ± 0,35	3,00 ± 0,47
Item 5	3,68 ± 0,38	3,14 ± 0,45
Item 6	3,61 ± 0,33	3,11 ± 0,40
Item 7	3,83 ± 0,29	3,20 ± 0,43
Item 8	3,77 ± 0,32	3,15 ± 0,37
Item 9	3,89 ± 0,28	3,22 ± 0,42
Item 10	3,71 ± 0,30	3,17 ± 0,40

These findings indicate that after receiving clinical supervision, nurses become better able to translate clinical knowledge into a form of education that is relevant, personalized, and easy for patients to understand. This is especially important in the context of caring for patients with chronic diseases, such as heart disease, where successful disease management is highly dependent on lifestyle changes driven by the patient's understanding of their health condition.

Second, a significant improvement was also found in the consistency of nurses in providing verbal education to patients every day, with an average score increase of 2,5 points. This increase reflects the strengthening of repetitive and continuous professional behavior as a result of a systematic supervision process. Clinic supervision not only encourages adherence to educational procedures but also strengthens nurses' awareness of the importance of continuous therapeutic communication, which plays an important role in building a relationship of trust between nurses and patients.

Third, the documentation of educational activities in nursing records also showed a increase in scores of 2,1 points. This aspect is often a challenge in day-to-day nursing practice, as documentation activities are considered burdensome. However, after the implementation of supervisory interventions, improvements in this aspect showed that nurses began to understand the importance of documentation as an integral part of professional accountability. Documentation serves as evidence of the implementation of duties and as a cross-professional communication instrument that ensures continuity of service and reduces the potential for medical errors (Akhu-Zaheya et al., 2018).

Overall, improvements in these three dimensions confirm that clinical supervision interventions not only impact the technical aspects of education implementation but also holistically strengthen the values of professionalism, responsibility, and accountability in nursing practice. Supervision carried out in a reflective and constructive manner has been shown to foster nurses' critical awareness of their educational role in patient care while forming more consistent and well-documented work behaviors.

These findings enrich the literature that supports the importance of clinical supervision as a strategy to improve the quality of nursing services, especially in terms of patient education. With improvements in the realm of knowledge, attitudes, and actions of nurses, this intervention makes a real contributes to improving patient health outcomes indirectly. Therefore, integrating the clinic supervision system into the hospital's human resource development policy is a strategic step that not only supports institutional accreditation but also improves the quality and safety of nursing services on an ongoing basis (Shaw et al., 2019).

This study demonstrates that structured clinical supervision effectively enhances nurses' compliance in delivering nutritional education to hospitalized cardiac patients. The substantial improvement in compliance observed in the intervention group supports the role of supervision as a behavioral-reinforcement mechanism. Rather than functioning solely as an evaluative tool, clinical supervision fosters reflective practice, feedback-based learning, and accountability, all of which are essential for translating guidelines into consistent bedside practice.

The most notable improvements were observed in communication-related items, such as explaining the link between diet and cardiac health, maintaining consistency in daily education, and using a simple, patient-friendly language. These findings highlight that prior to the intervention, gaps existed not only in technical knowledge but also in interpersonal and pedagogical skills. Such deficiencies can undermine patient understanding and adherence, ultimately affecting the clinical outcomes. The supervision process appears to have mitigated these weaknesses by creating structured opportunities for guided practice, feedback, and problem-solving, aligning with Proctor's model that emphasizes the educational and supportive functions of supervision (Perry et al., 2019).

Our findings are consistent with those of Cutcliffe et al. (2018) and Davys & Beddoe (2020), who reported that supervision significantly improves adherence to standards and documentation quality. Similarly, Mboweni & Makhado (2023) argue that supervision strengthens reflective learning and promotes sustainable quality improvement in nursing care. However, this study adds new evidence by demonstrating its applicability in the context of nutritional education for cardiac patients, a domain requiring both clinical accuracy and effective communication.

Practical Implications

These results underscore the need for hospital nursing management to institutionalize clinical supervision as part of routine, professional development. Regular supervisory sessions can

be integrated into ward-level coaching systems to enhance compliance with evidence-based practices, including patient education training. Additionally, hospitals should consider training ward managers as clinical supervisors to ensure the consistent implementation of this program. This approach aligns with hospital accreditation requirements for continuous quality improvement and can contribute to better patient outcomes through improved education on dietary management.

This study had several limitations. First, the quasi-experimental design without randomization introduced a potential selection bias despite efforts to match the baseline characteristics. Second, the relatively small sample size from a single hospital limits the generalizability of the results. Third, the study did not include a long-term follow-up to assess the sustainability of compliance or its impact on patient behavior and clinical outcomes. Future research should employ randomized controlled trials, include multiple hospital settings, and incorporate longitudinal assessments to capture both sustained nurse compliance and patient-level effects

Conclusion

This study proves that clinical supervision is significantly effective in improving nurses' compliance in providing nutrition education to hospitalized heart patients. A four-week structured supervision intervention significantly improved compliance scores, with a very large practical effect. Analysis per educational item showed that the highest improvements occurred in the dimensions of communication, consistency of educational delivery, and educational documentation, which are essential components of quality nursing care.

These findings confirm that clinical supervision serves not only as an administrative control mechanism but also as a professional coaching tool that reinforces the educational role of nurses in supporting changes in patient behavior. Therefore, the integration of clinical supervision into the nursing management system needs to be considered as a strategy to improve the quality of services, especially in chronic patient populations, such as people with heart disease.

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