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Effectiveness of a Nurse-Led Education Programme on Knowledge, Adherence and Complications of Oral Anticoagulation Therapy among Patients: A Pilot Study

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Abstract - Oral anticoagulation therapy is essential for preventing and treating thromboembolic complications. However, inadequate knowledge and poor adherence may increase the risk of adverse outcomes. This pilot study aimed to assess the effectiveness of a nurse-led education program on knowledge, adherence, and complications of oral anticoagulation therapy among patients in a selected hospital in Chennai. Methods: A quantitative, pre-experimental, one-group pretest-posttest design with repeated assessments was used for this pilot study. We selected ten patients receiving oral anticoagulation therapy using non-probability purposive sampling at Sri Ranga Heart Centre. Baseline data were collected on day 1 using a semi-structured demographic and clinical questionnaire, a 20-item structured knowledge questionnaire, the Modified Morisky Medication Adherence Scale, and a 10-item complications checklist. A nurse-led education programme consisting of video-assisted teaching and individual counselling was provided on day 1. Post-test 1 was conducted on day 15 by telephone and post-test 2 on day 30 during follow-up. Data were analysed using frequency, percentage, mean, standard deviation, paired t-test, repeated-measures ANOVA, and Karl Pearson's correlation coefficient.

Results: At baseline, all participants (100%) had inadequate knowledge. After the intervention, 70% had adequate knowledge and 30% had moderately adequate knowledge at post-test 1, while all participants (100%) had adequate knowledge at post-test 2. High adherence increased from 40% at pretest to 90% at post-test 1 and 100% at post-test 2. Low-level complications increased from 60% at pretest to 70% and 80% at post-test 1 and post-test 2, respectively, while moderate-level complications decreased from 40% to 30% and 20%. Repeated-measures ANOVA showed significant differences across the three assessments for knowledge ($F=355.26$, $p=0.0001$), adherence ($F=11.54$, $p=0.004$), and complications ($F=10.367$, $p=0.002$). Post-test 2 knowledge showed a weak positive, non-significant correlation with adherence ($r=0.229$, $p=0.525$) and no correlation with complications ($r=0.000$, $p=1.000$).

Conclusion: The pilot findings indicate that the nurse-led education program was feasible and was associated with improvement in knowledge and adherence and a reduction in the complications score over the three assessments. The findings support proceeding to the main study, while the small pilot sample requires cautious interpretation.

Keywords: oral anticoagulation therapy; nurse-led education; knowledge; medication adherence; complications; pilot study; anticoagulants

Introduction

Anticoagulation therapy is used to prevent and treat thromboembolic disorders. Oral anticoagulants require patients to understand the prescribed regimen, monitoring requirements, potential adverse effects, lifestyle considerations, and measures to prevent complications. The report describes oral anticoagulation therapy as an important component of management for conditions including atrial fibrillation, deep vein thrombosis, pulmonary embolism, and patients with prosthetic heart valves. Previous literature has also examined patient knowledge, adherence, and bleeding-related safety outcomes in oral anticoagulation therapy.

Vitamin K antagonists such as warfarin and acenocoumarol have been used widely, particularly where cost and clinical familiarity influence treatment choice. Their effects can be influenced by dietary vitamin K, drug interactions, and the need for regular INR monitoring. The clinical importance of safe anticoagulation and prevention of bleeding and thromboembolic complications has been emphasized in recent literature.

Patients may have inadequate understanding of medication dosage, laboratory monitoring, side effects, diet, safety measures, and adherence. Evidence from observational and intervention studies indicates that patient education can improve understanding and support adherence to oral anticoagulant therapy.

The investigator identified a need for improved patient education while working in a cardiac unit, where patients receiving anticoagulation therapy were observed to have gaps in knowledge regarding medication, side effects, adherence, and dietary restrictions. Based on this need, a pilot study was undertaken to assess the feasibility and preliminary effects of a nurse-led education programmeme.

The study aimed to assess pre- and post-intervention knowledge, adherence, and complications; assess the effectiveness of the nurse-led education programmeme; determine the relationship of post-intervention knowledge with adherence and complications; and examine associations with selected demographic and clinical variables.

Review of Literature

Nguyen et al. (2025) conducted a systematic review and meta-analysis of 32 studies (2018–2024) to examine bleeding complications and associated risk factors. The findings revealed that bleeding accounted for nearly 54% of reported adverse drug events, with gastrointestinal bleeding being the most common. The authors recommended anticoagulant stewardship programs, strict monitoring protocols, and improved clinical decision support systems to enhance patient safety.

Stella et al. (2026) conducted a multicenter prospective observational study in Italy to assess knowledge, adherence, and quality of life among patients receiving oral anticoagulants. Women demonstrated higher knowledge scores than men, while knowledge and adherence varied across centers. Patients understood lifestyle aspects better than scientific treatment details. Quality of life varied by demographic factors, and knowledge was weakly associated with adherence. The study concluded that patient education may improve understanding of anticoagulant therapy and promote treatment adherence.

Hanita et al. (2026) conducted a quasi-experimental study among 64 newly initiated warfarin patients to assess the effectiveness of a nurse-led education programme on knowledge and medication adherence. The intervention covered dosage, dietary restrictions, drug interactions, activity precautions, and recognition of complications. The findings showed significant improvements in knowledge and medication adherence, highlighting the importance of patient education in anticoagulant therapy.

Methods

Study design and setting

A quantitative approach and a pre-experimental one-group pretest-posttest design with three assessment points were used. The pilot study was conducted at Sri Ranga Heart Centre. The data collection period was from 26 January 2026 to 7 February 2026.

Participants and sampling

Ten patients receiving oral anticoagulation therapy who met the eligibility criteria were selected using non-probability purposive sampling. Participants included both men and women who had been receiving a vitamin K antagonist for 6 months to 1 year, were receiving treatment for cardiac medical, surgical, or structural conditions, attended the outpatient department, understood and spoke Tamil or English, and were willing to participate. Patients who were critically ill or had cognitive deficits, were taking oral anticoagulants for other medical or surgical disorders, or were receiving direct oral anticoagulants were excluded.

Intervention

The nurse-led education programme was delivered on day 1. It included video-assisted teaching for groups of 4–5 patients on the mode of action, purposes, side effects, importance of laboratory monitoring, adherence, lifestyle modification, diet, safety measures, exercise, and prevention of complications. Need-based individual counselling was also provided for approximately 45 minutes. A home-care management pamphlet was distributed on day 30. The intervention content was consistent with the educational domains described in previous anticoagulation education research.

Outcome measures

Knowledge was assessed using a 20-item structured multiple-choice questionnaire covering basic anticoagulation therapy, dosage and monitoring, side effects and complications, and lifestyle modification. Each correct response received one mark. Adherence was assessed using a 15-item Modified Morisky Medication Adherence Scale, with scores categorized as high (>75%), moderate (50–75%), or low (<50%). Complications were assessed using a 10-item checklist, with responses scored as yes=1 and no=0 and categorized as high (>75%), moderate (50–75%), or low (<50%).

Data collection procedure

After permission was obtained from the concerned authority of the institution to conduct the study and informed consent was secured from participants, baseline information was collected on day 1 through an interview schedule. The nurse-led education programme was then administered. Post-test 1 was conducted on day 15 through telephone conversation, and post-test 2 was conducted in person on day 30 during follow-up. The approximate interview time was 15–20 minutes per participant, and the education and counselling session took approximately 45 minutes.

Validity and reliability

The tools were reviewed by three Medical-Surgical Nursing experts and two cardiologists, and the suggestions provided were incorporated. Test-retest method was used to check the reliability of the tools. The reliability scores were, r=0.84,0.79, and 0.80 for knowledge , adherence and complications respectively. .

Ethical considerations

The report states that ethical clearance was to be obtained from VHS-M.A. Chidambaram College of Nursing and permission from the institutional authorities. Written informed consent was obtained from participants, and confidentiality was maintained.

Data analysis

Descriptive statistics included frequency, percentage, mean, and standard deviation. Paired t-tests were used for pairwise comparisons across assessment points. Repeated-measures ANOVA was used to compare the three repeated assessments. Karl Pearson's correlation coefficient was used to examine the relationship of post-test 2 knowledge with adherence and complications. Chi-square testing was used to examine associations with selected demographic and clinical variables.

Results

Participant characteristics

Among the 10 participants, 40% were aged 51–60 years, 30% were aged 41–50 years, 20% were above 60 years, and 10% were aged 30–40 years. Half were male and half were female. Forty percent had no formal education and 40% had primary education. Sixty percent were unemployed, 90% had a monthly family income below Rs. 30,000, all participants were Hindu and belonged to nuclear families, and 90% resided in urban areas.

Regarding clinical characteristics, 90% had undergone heart valve replacement, and 10% had undergone coronary artery bypass grafting. Half had been diagnosed at 51–60 years of age. Diabetes mellitus was present in 50%, while 20% had both diabetes and hypertension. Forty percent had received oral anticoagulation therapy for 8–10 months and another 40% for 10–12 months. Eighty percent took the medication once daily and 80% reported taking other medications. Eighty percent were aware of anticoagulation therapy, with healthcare professionals identified as the source of information. Twenty percent reported alcohol use and 30% reported smoking.

Knowledge, adherence and complications

At pretest, all 10 participants (100%) had inadequate knowledge. At post-test 1, 70% had adequate knowledge and 30% had moderately adequate knowledge. At post-test 2, all participants (100%) had adequate knowledge.

For adherence, 60% had moderate adherence and 40% had high adherence at pretest. At post-test 1, 90% had high adherence and 10% had moderate adherence. At post-test 2, all participants (100%) had high adherence.

For complications, 60% had low-level complications, and 40% had moderate-level complications at pretest. At post-test 1, 70% had low-level complications and 30% had moderate-level complications. At post-test 2, 80% had low-level complications and 20% had moderate-level complications. No participant was classified as having high-level complications at any assessment.

Comparison across assessments

Mean knowledge increased from 6.10 (SD 1.66) at pretest to 16.40 (SD 1.51) at post-test 1 and 18.00 (SD 0.82) at post-test 2. Mean adherence increased from 54.80 (SD 9.60) to 62.00 (SD 5.68) and 65.20 (SD 2.97), respectively. Mean complications score decreased from 4.00 (SD 0.94) at pretest to 3.40 (SD 1.17) at post-test 1 and 2.90 (SD 1.19) at post-test 2.

Repeated-measures ANOVA demonstrated statistically significant differences across the three assessment points for knowledge ($F=355.26$, $p=0.0001$), adherence ($F=11.54$, $p=0.004$), and complications ($F=10.367$, $p=0.002$). Pairwise comparisons also showed significant changes for knowledge and adherence across the reported comparisons. For complications, the pretest-to-post-test 1 comparison was significant ($p=0.024$), the post-test 1-to-post-test 2 comparison was significant ($p=0.003$), whereas the pretest-to-post-test 2 comparison was reported as not significant ($p=0.052$).

Correlation and association

Post-test 2 knowledge had a weak positive correlation with adherence ($r=0.229$, $p=0.525$), which was not statistically significant. Knowledge had no correlation with complications ($r=0.000$, $p=1.000$). The report also states that there was no statistically significant association between post-intervention knowledge, adherence, and complications and the selected demographic and clinical variables.

Feasibility

No practical difficulty was experienced in sample selection or data collection. The report concluded that the tools and procedures were feasible and recommended proceeding to the main study without modification.

Discussion

The pilot study demonstrated improvement in knowledge following the nurse-led education programme. All participants had inadequate knowledge at baseline, whereas 70% had adequate knowledge by post-test 1 and all participants had adequate knowledge by post-test 2. The corresponding increase in mean knowledge score from 6.10 to 18.00 and the significant repeated-measures ANOVA result indicate a marked change across the three assessments. Previous studies have reported similar improvements in knowledge following nurse-led anticoagulation education (3).

Adherence also improved across the assessment period. The proportion of participants with high adherence increased from 40% at baseline to 90% at post-test 1 and 100% at post-test 2. The mean adherence score increased from 54.80 to 65.20, with a statistically significant overall difference across the three measurements. Previous observational evidence has also identified a relationship between patient knowledge and adherence, supporting the relevance of structured patient education (2).

The complications score decreased over time, from a mean of 4.00 at baseline to 2.90 at post-test 2. The distribution also shifted toward the low-complication category. Because the complications measure is a score in which lower values indicate fewer complications, the reduction in mean score is directionally consistent with improvement. However, the pairwise pretest-to-post-test 2 comparison did not reach statistical significance at the 0.05 level ($p=0.052$), despite the overall repeated-measures ANOVA being significant.

The correlation analysis showed that higher post-test 2 knowledge was not significantly related to adherence or complications in this pilot sample. The weak positive relationship between knowledge and adherence ($r=0.229$) should therefore be interpreted as preliminary. The absence of correlation between knowledge and complications ($r=0.000$) should not be interpreted as evidence that no relationship exists in the wider population because the pilot sample consisted of only 10 participants. The pilot result should be interpreted cautiously because of the small sample size.

Overall, the feasibility findings support implementation of the main study. The small sample size and single-group design limit causal interpretation, and the pilot findings should be considered preliminary.

Conclusion

The pilot study found that the nurse-led education programmeme was feasible to implement and was associated with improvement in knowledge and adherence and a reduction in the complications score over the three assessment points. Significant overall differences were observed for knowledge, adherence, and complications. The correlation between post-test 2 knowledge and adherence was weak and non-significant, while no correlation was observed between knowledge and complications. Given the pilot nature and small sample size, these findings should be interpreted cautiously and used primarily to support the feasibility and planning of the main study.

Implications

Nursing practice

Nurses can provide structured education regarding anticoagulant use, monitoring, adherence, lifestyle modification, safety precautions, and prevention of complications as part of routine outpatient follow-up.

Nursing education

The findings support inclusion of structured anticoagulation education and counselling in nursing education and continuing professional development.

Nursing research

The pilot findings provide feasibility information for the planned main study with a larger sample. Future research should use an adequately powered sample and, where feasible, a controlled design to strengthen causal inference.

Limitations

The pilot study included only 10 participants and used non-probability purposive sampling. The absence of a control group limits causal attribution of the observed changes to the nurse-led education programme. The study was conducted in a single cardiac centre, which may limit generalizability. The short follow-up period also limits conclusions about longer-term adherence and complications.

Declarations

Ethics approval and consent

Ethical clearance was obtained from VHS-M.A. Chidambaram College of Nursing and written informed consent was obtained from each participant.

Conflicts of interest

Not reported in the pilot study report.

Funding

Not reported in the pilot study report.

Data availability

Not reported in the pilot study report.

References

Nguyen UT, Nguyen MH, Duong KNC, Nguyen PTL, Cao HTT, Nguyen QN, Vu HD, Nguyen HA. Risk factors of anticoagulation-related bleeding in hospitalized patients: a systematic review and meta-analysis. Expert Opin Drug Saf. 2026;23:1-12. doi:10.1080/14740338.2026.2612980.

Stella M, Boccardi D, Baiardi G, Lantieri F, Astuni P, Sacco F, Pasquariello S, Cameran Caviglia M, Zanini M, Natali E, Robbiano L, Caneva G, Duce R, Antonucci G, Innocenti L, Nanni L, Mattioli F. Patient knowledge and adherence to oral anticoagulation therapy: findings from an observational study in Italian tertiary care hospitals. Patient Prefer Adherence. 2026;20:610940. doi:10.2147/PPA.S610940.

Zaini NH, Makhdzir N, Sharifah Shafinaz SA, Abdul Aziz AF, Maniam R, Mohd Mokhtar HH. Effectiveness of nurse-led warfarin educational programme on knowledge and compliance for patients newly commenced on warfarin therapy. Malays J Med Health Sci. 2026;22(1):1-8. doi:10.47836/mjmhs.v22i1.1417.

Table 1. Demographic and Clinical Characteristics of Participants (N = 10)

Characteristic	Category	n	%
Age (years)	30–40	1	10
	41–50	3	30
	51–60	4	40
	>60	2	20
Gender	Male	5	50
	Female	5	50
Educational status	No formal education	4	40
	Primary education	4	40
	High school education	2	20
Occupation	Employed	4	40
	Unemployed	6	60
Monthly family income	<₹30,000	9	90
	₹30,001–40,000	1	10
Religion	Hindu	10	100
Marital status	Married	6	60
	Divorced	3	30
	Widowed	1	10
Type of family	Nuclear family	10	100
Area of residence	Urban	9	90
	Semi-urban	1	10
Reason for anticoagulation	Heart valve replacement	9	90
	Coronary artery bypass grafting	1	10
Age at diagnosis (years)	30–40	1	10
	41–50	3	30
	51–60	5	50
	>60	1	10
Comorbidities	Diabetes mellitus	5	50
	Hypertension	1	10
	Stroke	1	10
	Other conditions	1	10
	Diabetes and hypertension	2	20
Duration of oral anticoagulation	6–8 months	2	20
	8–10 months	4	40
	10–12 months	4	40
Frequency of intake	Once daily	8	80
	Twice daily	2	20
Other medications	Yes	8	80
	No	2	20
Dietary pattern	Non-vegetarian	9	90
	Egg-vegetarian	1	10
Aware of anticoagulation therapy	Yes	8	80
	No	2	20
History of alcoholism	Yes	2	20
	No	8	80
History of smoking	Yes	3	30
	No	7	70

Note: n = frequency; % = percentage. The clinical categories are based on the pilot-study data collection schedule.

Table 2. Distribution of Participants According to Knowledge, Adherence and Complication Levels at Three Assessment Points (N = 10)

Outcome	Assessment	Category	n	%
Knowledge	Pre-test	Inadequate	10	100
	Post-test 1	Moderately adequate	3	30
		Adequate	7	70
	Post-test 2	Adequate	10	100
Adherence	Pre-test	Moderate	6	60
		High	4	40
	Post-test 1	Moderate	1	10
		High	9	90
	Post-test 2	High	10	100
Complications	Pre-test	Low	6	60
		Moderate	4	40
	Post-test 1	Low	7	70

		Moderate	3	30
	Post-test 2	Low	8	80
		Moderate	2	20

Note: Knowledge: <50% = inadequate, 50–75% = moderately adequate, >75% = adequate. Adherence and complication levels were categorized according to the study scoring criteria.

Table 3. Pairwise Comparison of Knowledge, Adherence and Complication Scores Across Assessment Points (N = 10)

Outcome	Comparison	Mean ± SD	Mean difference	t	p value
Knowledge	Pre-test vs Post-test 1	6.10 ± 1.66 vs 16.40 ± 1.51	10.30	16.730	<0.001
	Pre-test vs Post-test 2	6.10 ± 1.66 vs 18.00 ± 0.82	11.90	4.000	0.003
	Post-test 1 vs Post-test 2	16.40 ± 1.51 vs 18.00 ± 0.82	1.60	29.247	<0.001
Adherence	Pre-test vs Post-test 1	54.80 ± 9.60 vs 62.00 ± 5.68	7.20	2.813	0.020
	Pre-test vs Post-test 2	54.80 ± 9.60 vs 65.20 ± 2.97	10.40	3.105	0.013
	Post-test 1 vs Post-test 2	62.00 ± 5.68 vs 65.20 ± 2.97	3.20	3.893	0.004
Complications	Pre-test vs Post-test 1	4.00 ± 0.94 vs 3.40 ± 1.17	0.60	2.714	0.024
	Pre-test vs Post-test 2	4.00 ± 0.94 vs 2.90 ± 1.19	1.10	2.236	0.052
	Post-test 1 vs Post-test 2	3.40 ± 1.17 vs 2.90 ± 1.19	0.50	3.973	0.003

Note: SD = standard deviation; t = paired t-test statistic. $p < 0.05$ was considered statistically significant. The pre-test to post-test 2 comparison for complications was not statistically significant ($p = 0.052$).

Table 4. Comparison of Knowledge, Adherence and Complication Scores Across Three Assessment Points Using Repeated-Measures ANOVA (N = 10)

Outcome	Pre-test, Mean ± SD	Post-test 1, Mean ± SD	Post-test 2, Mean ± SD	F	p value
Knowledge	6.10 ± 1.66	16.40 ± 1.51	18.00 ± 0.82	355.26	<0.001
Adherence	54.80 ± 9.60	62.00 ± 5.68	65.20 ± 2.97	11.54	0.004
Complications	4.00 ± 0.94	3.40 ± 1.17	2.90 ± 1.19	10.367	0.002

Note: SD = standard deviation; F = repeated-measures ANOVA statistic. $p < 0.05$ indicates statistical significance.

Table 5. Correlation of Post-test 2 Knowledge With Adherence and Complications (N = 10)

Variables	Mean ± SD	Pearson r	p value	Interpretation
Knowledge and adherence	18.00 ± 0.82; 65.20 ± 2.97	0.229	0.525	Not significant
Knowledge and complications	18.00 ± 0.82; 2.90 ± 1.19	0.000	1.000	Not significant

Note: r = Pearson correlation coefficient; $p > 0.05$ = not statistically significant.