



**IMPACT OF CLINICAL PHARMACIST INTERVENTIONS IN USE OF ORAL ANTI-CLOTTING AGENTS**

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**ABSTRACT**

Anticoagulants and antiplatelet agents are medicines that reduce blood clotting in an artery, a vein or the heart. Blood clots can block the blood flow to your heart muscle and cause a heart attack. They can also block blood flow to your brain, causing a stroke. Pharmacist's unique knowledge of pharmacology, pharmacokinetics and interactions makes them well-suited to assist patients in maintaining safe and effective therapy. Successful therapy improves patient adherence, implies fewer incidences of therapeutic failures and bleeding complications. A total of 187 patients with anti-clotting therapy was randomised and analysed, Knowledge was assessed to both groups before and after education, in control group has no significant difference in score from 2.39±2.18 to 2.50±2.30 (P=0.078), in intervention group score was improved from 2.15±1.67 to 3.98±2.05 (p=0.001) and adherence score by Mo risky scale in intervention group improved from 4.01±1.84 to 2.07±1.32 (p=0.001) and in control group no difference 3.80±1.84 to 3.72±1.81 (p=0.2387) and 24 interactions and 16 adverse effects reported in control group due to lack of knowledge and in intervention group 8 interactions and 8 adverse effects were reported. This concludes that pharmacist intervention play an role in improving adherence, and quality of life.

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**INTRODUCTION**

Over the past 40 years, major changes have occurred in the area of anticoagulation management. New strategies have been developed for older anticoagulants, older beliefs have been challenged, new anticoagulants have been introduced, and new indications have been identified for existing anticoagulants. The role of the pharmacist in managing anticoagulant therapy has been established, and clinicians have learned more about the critical importance of medication safety. Advances have spanned from the outpatient setting to the critical care setting<sup>1</sup> Anticoagulants and antiplatelet agents are medicines that reduce blood clotting in an artery, a vein or the heart. Blood clots can block the blood flow to your heart muscle and cause a heart attack. They can also block blood flow to your brain, causing a stroke. Pharmacist's unique knowledge of pharmacology, pharmacokinetics and interactions makes them well-suited to assist patients in maintaining safe and effective therapy. Successful therapy improves patient adherence, implies fewer incidences of therapeutic failures and bleeding complications.

Pharmacists can play an important role in keeping patients with atrial fibrillation adherent to anticoagulants.

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Adherence to anticoagulant therapy is important when considering that a missed dose could mean a lack of protection. Pharmacists can monitor adherence during transitions of care from the hospital to outpatient treatment by tracking whether the patient tolerates the prescribed anticoagulant. Some other ways in which pharmacists can help atrial fibrillation patients stay adherent are refill reminders and patient education.

**Anti clotting agents**

Anticoagulants and antiplatelet agents are medicines that reduce blood clotting in an artery, a vein or the heart. Blood clots can block the blood flow to your heart muscle and cause a heart attack. They can also block blood flow to your brain, causing a stroke<sup>1</sup>.

Anti-clotting medication is used to prevent blood clots from forming, and therefore lower the risk of certain cardiovascular diseases like heart attacks and strokes. As the name suggests, they make sure that the blood does not clot as quickly. The colloquial term "blood thinner" is not strictly correct, because the medication does not actually thin the blood, but rather make sure that certain components of the blood do not stick together so easily. Anti-clotting medications can be divided into two groups: Anticoagulants stop clotting factors from forming or working. Antiplatelets stop the blood platelets (thrombocytes) from clotting so easily<sup>8,9</sup>.

### Anti-coagulants

An anticoagulant is a drug (blood thinner) that treats, prevents, and reduces the risk of blood clots-breaking off and traveling to vital organs of the body, which can lead to life threatening situations. They work by preventing blood from coagulating to form a clot in the vital organs such as the heart, lungs, and brain [2,22,24].

For example, a DVT or deep vein thrombosis (blood clot in the leg or lower extremity) can happen if you have a medical condition that keeps you immobile or if you have been sitting for a long period of time without getting up and stretching, like traveling by plane, car, or train.

If the clot breaks off from the vein or artery of a leg it can get lodged in the blood vessels of the lung where it can form a clot in the lung (pulmonary embolism). This is a life threatening medical condition. Similarly, a stroke can be caused by a clot lodged in a vessel in the brain [3,11,12,13]. Anticoagulant treatment is used to prevent the formation of new blood clots, and to treat existing clots by preventing them from growing larger in size. It also reduces the risk of embolization of blood clots to other vital organs such as the lungs and brain.

The pharmacist's role in managing anticoagulation therapy in the inpatient setting has also been established. An evaluation of over 700 000 Medicare patients from almost 1000 hospitals found that those without pharmacy-directed heparin and warfarin management had higher mortality rates, length of stay, Medicare charges, bleeding rates, and transfusion requirements. Pharmacy managed anticoagulant therapy improves the quality and safety of such therapy in the inpatient and outpatient setting.

Pharmacist guided anticoagulation clinics play an important role in managing anticoagulation therapy for both hospitalised patients and outpatients in western countries.[10] Trained in the basic pathophysiology of blood clotting and the essentials of clinical clotting disorders, pharmacists bring their expertise in clinical pharmacology and knowledge of drug interactions to the arena of patient management. Many anticoagulation clinics are staffed only by clinical pharmacists, and there is an indication that this practice has led to nothing except excellent care. The multidisciplinary team effort provides truly optimal care for a population of patients having a high level of comorbidity. [12]

### MATERIALS AND METHODS

The study was carried out at the department of general medicine and at the department of cardiology in government general hospital, Guntur. The study got ethical clearance from the institutional ethical committee and written informed consent was obtained from all the study participants. The study population consisted of patients admitted to the department of general medicine and cardiology and who were prescribed with oral anti-clotting agents. Intervention group consisted of all 93 patients randomly admitted to general medicine and cardiology during the study period and who satisfied the inclusion and exclusion criteria. Ninety four (94) randomly selected patients from general medicine and cardiology department on oral use of anti-clotting agents served as the control group. Patient data relevant to the study were obtained by direct interview of patient and/ or caregiver, and from the patients' medical record and documented in the data collection

form. The data collection form was provided with the information regarding the demographic details of the patient, blood pressure(BP), comorbid conditions, indication for anti-clotting agents, lab data including international normalized ratio(INR) values, prothrombine time(PT). Data regarding adverse drug reactions (ADR) related to anti-clotting agents, drug and food interactions with drugs, medication adherence was measured by using the MO risky adherence scale and a questionnaire was used to assess patient's knowledge on oral anti-clotting agents.

Patient's knowledge on oral anti-clotting agents was assessed using a questionnaire comprising of 10 questions. Scores 0 to 10 were given for each question, respectively. During the study period, the baseline knowledge on oral anti-clotting therapy and its importance, common ADRs and management, importance of patient compliance, dose titration, dietary modifications, and the need for INR, PT monitoring. Information leaflets also provided to all the patients and counselled the patients in intervention group. The knowledge of the intervention group was reassessed during the follow up using the same questionnaire when they came for review after 1 month.

### Inclusion criteria

Patients with oral anti-clotting therapy (Irrespective of gender), Patient above 18 years of age Both male and female patients irrespective of genders, Patients who are willing to give informed consent

### Exclusion criteria

Patients who are with severe renal insufficiency, Patients having visual or hearing impairment, Patients with psychiatric disorder, Patient using parenteral anticlotting therapy.

### Statistical analysis

Data recorded was entered in Microsoft excel 2010 and SPSS. Statistical analysis was done using graph pad prism and SPSS. All the values were expressed in actual number, percentage, and mean  $\pm$  standard deviation. Student paired t test was used for nonparametric data. Probability "p" value of less than 0.05 was considered as statistically significant. Methodology is A randomised prospective case-control interventional study

### Study period

The study was conducted in 6 months period i.e., from October 2017- March 2018.

### RESULTS

**Table 1** summary of baseline characteristics of the study patients (n=187)

Characteristics	Intervention(n=93)	control(n=94)
Total no.of patients	93	94
Males(no%)	59(63.4%)	47(50%)
Females(no%)	34(36.5%)	47(50%)
Mean age of male patients	55.537 $\pm$ 12.558	57.184 $\pm$ 11.980 (years) $\pm$ S.D.
Mean age of female patients	55.395 $\pm$ 13.05	57.021 $\pm$ 11.903 (years) $\pm$ S.D.
Patients with no comorbidity	39	31
Patients with $\geq$ 1 comorbidity	54	63
No of patients with bleeding	3	5
Drug interactions found	8	24

Total number of patients recruited at the initiation of the study was 207. Table.1: summarises the baseline characteristics of patients in the intervention and control groups. In total of 187 study population recruited it was observed that 56.68% of male more than compared to female percentage is 43.31%. Patients with mean age of intervention group was 55.53±12.55 years with minimum of 25 and maximum of 74 years and that of control group patients was 57.02±11.90 years with minimum of 29 and maximum of 84 years.

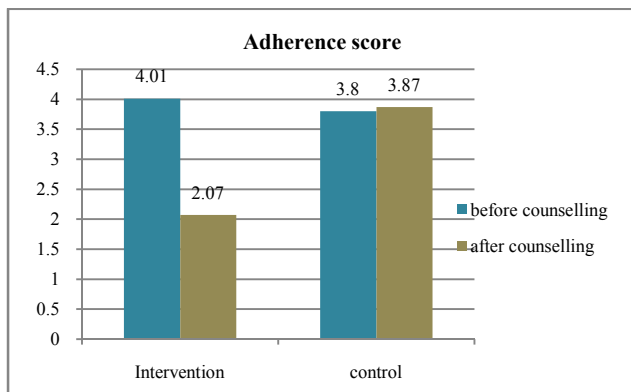
**Table 1** Study population with adverse effects

Adverse Effects	Intervention	Control
Bleeding	4	7
Bruising	1	3
Git complication	2	4
Headache	1	2

Among 187 study population in intervention group out of 93-4(4.3%) with bleeding, 1(1.07%) with bruising, 2(2.15%) with git complications, 1(1.07%) with headache, and in control group out of 94 – 7(7.44%) with bleeding, 3(3.19%) with bruising, 4(4.25%) with git complications, 2(2.12%) with headache.

**Table 2** Score of medication adherence by Mo risky adherence scale

Adherence score	Intervention (Mean ± S.D)	Control (Mean ± S.D)
Before counselling	4.01±1.84	3.80±1.84
After counselling	2.07±1.3	23.72±1.81

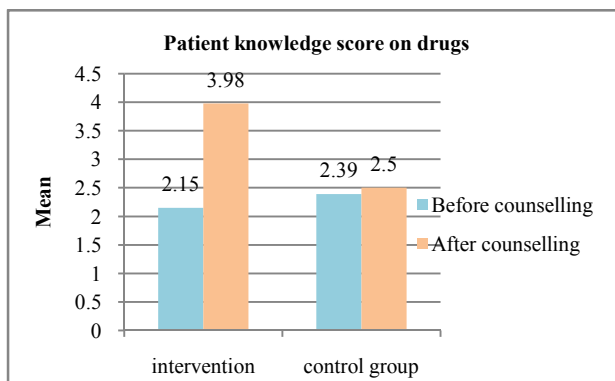


**Fig 1** Scoring on patient medication adherence by Mo risky scale

By Mo risky adherence scale assessed the adherence of study population on drugs found in intervention arm adherence was improved after counselling.

**Table 3** Scoring of patient knowledge on oral anti-clotting agents

Knowledge score	Intervention (Mean ± S.D)	Control (Mean ± S.D)
Before counselling	2.15±1.67	3.98±2.05
After counselling	2.39±2.18	2.50±2.30



**Fig 2** scoring patient knowledge on by a questionnaire

**Knowledge score of samples on drugs (Anticlotting agents)**

1. What is your age?
2. What is your gender?
3. What is your diagnosis?
4. Do you know what type of drug you are using? (Antiplatelet/Anticoagulant)
5. If yes from how many days are you using this drug?
6. Do you know what this antiplatelet or anticoagulant does to you
7. Do you know the risk of stopping the drug (aspirin/acitrom) before consultation of your physician?
8. Are you experiencing any of following after using this drug?
  - a. Bleeding
  - b. Bruising
  - c. Headache
  - d. Fatigue
  - e. GI complications
  - f. Others
9. Do you know what methods are used for controlling bleeding?
10. Do you know what PT/INR test is for?

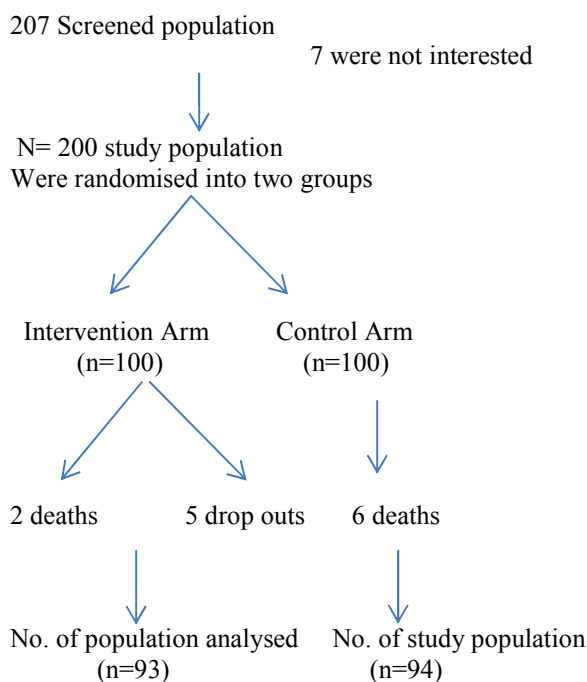
**DISCUSSION**

We conducted a Randomised prospective case-control interventional study to assess patient knowledge on oral use of anti-clotting agents before pharmacist counselling and after counselling and to assess adherence to medication, patient satisfaction and quality of life of a patient.

In our study, a total of 207 patients were screened out of 207 population screened 7 were not interested in study and out of 200 are randomised into two groups intervention (n=100) and control group(n=100) but there are dropouts in the study 2 deaths and 5 were dropped from study they couldn't attend follow up and in control group 5 deaths and remaining population were n=94 in control group and n=93 in interventional group.

In study included population was randomised into two arms based on method simple randomisation to avoid bias, divided our study population based on hospitalization if first hospitalized into intervention arm and second into control arm continuously.

In present study population included are 49.7% population in intervention and 50.2% population in control group. In present study out of 187 population in arm one i.e. is intervention arm males are 63% and female are 36% and in control arm males are 50% and females are 50%. The mean age of males patients in intervention arm was 55.53±12.55 years with minimum of 25 and maximum of 74 years and control arm mean age was 57.02±11.90 years with minimum of 29 and maximum of 84 years. Among 187 population included in the study using anti-clotting agents in intervention arm population with No comorbidities 37.6%, with one comorbidities 35.4%, with two comorbidities 22.5%, with three comorbidities 4.30% and in control arm population with No comorbidities 30.8%, 43.6% are with one comorbidities, 23.4% are with two comorbidities, 2.12% are with three comorbidities, and largest population with hypertension which comparable to the study conducted by Walid Amara *et al.*, EP Europace, Volume 18, Issue 1, 2016.



During study period Anti-clotting agents are indicated for the diseases like coronary artery disease and atrial fibrillation and stroke in both the groups.

In present study a questionnaire was used to assess knowledge on use of oral anti-clotting agents included study population in two arms to assess baseline knowledge score in intervention arm was  $2.15 \pm 1.67$ , study population in intervention group were counselled by a pharmacist about use, dose, administration techniques, unwanted effects and adherence of oral anticlotting agents and then after one month follow up, in post counselling same questionnaire given to study population in intervention arm then knowledge score was increased to  $3.98 \pm 2.05$  on use of oral anti-clotting agents. In control arm baseline knowledge score  $2.39 \pm 2.18$  and after one month post counselling score was  $2.50 \pm 2.30$ , by using paired sample t-test we found p value  $0.078 (p > 0.005)$  not statically significant. In intervention arm by using paired sample t-test p value found to be  $0.001 (p < 0.005)$  which is statically significant it indicates and there was an pharmacist role in improving the knowledge on use of oral anticlotting agents which was similar to the study conducted by James E, Kirthivasan R *et al.*, Study on Impact of Clinical Pharmacist's Interventions in the Optimal Use of Oral Anticoagulants in Stroke Patients.

During study adherence on drugs by study population was assessed by Mo risky Adherence scale by a adherence scale score was calculated to adherence by study population in both arms In Intervention arm, adherence score before counselling was  $4.01 \pm 1.84$  and after two to three months post counselling score was  $2.07 \pm 1.32$  by using paired sample t-test p value found to be  $0.001 (p < 0.005)$  statistically significant and in control arm adherence score by using Mo risky adherence scale  $3.80 \pm 1.84$  and after two to three months follow up score was reassessed  $3.72 \pm 1.81$  by using ttest p value found to be  $0.2387 (p > 0.005)$  which was not statistically significant indicating pharmacist role in improving the adherence of medication used by study population which comparable to the study conducted by Walid Amara *et al.*, EP Europace, *et al.*... During study period drug interactions found in intervention arm was 12 and in control arm was 24, and adverse effects found intervention arm was population reported with bleeding-

4 and bruising-1, with git complications-2, and with headache-1 and in control arm reported adverse effects are population with bleeding - 7, 3 with bruising, 4 with git complications, 2 with headache which was similar to study conducted by Poojitha Reddy Reddy *et al.*,

By providing periodic counselling it was found that there was significant improvement in knowledge on drugs increasing adherence and reducing drug-food interactions and drug-drug interactions reducing hospitalization of a patient reduces economic burden of patient and improving quality of life of patient.

## CONCLUSION

Patient knowledge is the key to safe and effective use of Acenocoumarol and other oral anticoagulants. Patients should be aware of the indications, monitoring requirements, drug-drug and drug-food interactions and the adverse reactions to watch for. There is a positive relationship between their knowledge and the outcomes of therapy. The present study shows that the patient's knowledge on oral anticoagulation was improved in intervention group patients and they achieved better therapeutic outcome compared with the control group patients. The study results concludes that pharmacist intervention play an role in anticlotting therapy improving adherence and knowledge, improves the quality of life.

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