International Normalize Ratio (INR) on Cardiology Clinic in Digna Price Hospital (Port Sudan), Sudan

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Abstract: _Introduction_ _While an INR between 2 and 3 is typically required for effective anticoagulation and carries a low risk of bleeding, the risk of bleeding increases as the INR rises. When there is a significant risk of thromboembolism, an INR of 3-4.5 is required. The risk of bleeding is comparable to that of patients who are not receiving treatment if the INR is less than 1.5. There are several solutions available in the event of bleeding and/or overdose (INR >6)._ _Objective:_ _To investigate the effects of a telehealth program on the international normalized ratio level in patients who used warferin._ _Methods:_ _69 patients who visited the cardiology referral clinic at Digna Price Hospital in Port Sudan, Sudan, on warfarin between May 2024 and December 2024 are the subjects of this convenient study. Each participant signed an informed consent form after being informed about the study's details. Age, sex, warferin dosage, and INR outcome._ _Results:_ _The majority of the 69 patients who used warfrine to participate in this trial were over 50, Warfrine was frequently used to replace valves According to the study's P value of 1.000, there was no discernible correlation between age and rising INR. The INR for the majority of patients in this group was below target, at 34 (29.6%)._ _Discussion:_ _There was shown to be a relationship between warfarin dose and plasma levels. There was no significant association between the two variables, despite a pattern of growing INR with rising plasma warfarin levels. These results confirmed the conclusion of a previous study that the concentration of warfarin has no discernible effect on the INR; this study was limited by its small sample size._

Keywords: warfarin, INR monitoring, anticoagulation, telehealth, cardiovascular disease

1.Introduction

Because oral anticoagulant therapy (OAT) has a wide range of indications, the majority of which call for lifelong use of these medications, the number of patients in need of OAT has been steadily rising globally. [1] Despite early encouraging research, there is a dearth of information from randomized trials about the safety and effectiveness of novel oral anticoagulants (NOACs), which are frequently used to treat atrial fibrillation (AF), in patients who have mechanical cardiac valves (MCVs) or mechanical cardiac support (MCS) devices. [2-5] A study that looked at NOACs in patients with MCV was abruptly stopped because of negative side effects. [6] Warfarin is still the most often prescribed OAT at this time. [7]

Tight and regular international normalized ratio (INR) monitoring is a prerequisite after the initiation of warfarin treatment. [8] Traditional INR measuring techniques necessitate the patient's presence at a medical facility for blood collection, which raises expenses and workload.

The only oral anticoagulant medications now on the market are phenindione and warfarin, also known as acenocoumarol. Although their plasma half-lives differ, normal coagulation typically returns two to four days after stopping the medication. The dosage and the patient's drug susceptibility determine the anticoagulant effect. This effect is correctly reflected by the International Normalized Ratio (INR). While an INR between 2 and 3 is typically required for effective anticoagulation and carries a low risk of bleeding, the risk of bleeding increases as the INR rises.

When there is a significant risk of thromboembolism, an INR of 3-4.5 is required. The risk of bleeding is comparable to that of patients who are not receiving treatment if the INR is less than 1.5. There are several solutions available in the event of bleeding and/or overdose (INR >6). If there is no bleeding, stopping medication and taking vitamin K orally can be enough. Intravenous vitamin K (5-10 mg) and prothrombin complex (30-50 units/kg) or fresh frozen plasma should be considered when there is significant bleeding. Smaller IV vitamin K dosages, such as 0.5-2.5 mg, should be administered for mild bleeding. [8]

The following variables may have an impact on how accurately the INR is determined: Compliance with antagonists of vitamin K: In clinical practice, adherence to vitamin K antagonists can be difficult due to their interactions with food and medications, which necessitate frequent monitoring and dose modifications.

Drug interactions: Medications can elevate or lower the INR.

The following medications have the potential to raise the INR: Antibiotics: fluoroquinolones, metronidazole, macrolides, and cotrimoxazole Azoles, like fluconazole, are antifungals. Chemotherapy: 5-fluorouracil and imatinib Other: serotonin reuptake inhibitors including sertraline and fluoxetine, amiodarone, and allopurinol the following medications have the potential to lower the INR: Nafcillin and dicloxacillin are antibiotics. Other medications include vitamin K, St. John's Wort, carbamazepine, phenobarbital, and phenytoin, as well as azathioprine. Comorbidities: INR levels, coagulation homeostasis, and the efficacy of

warfarin can all be impacted by chronic liver illness. INR control may also be impacted by acute illnesses like infections and gastrointestinal disorders. [9]

Objective:

To investigate the effects of a telehealth program on the international normalized ratio level in patients who used warferin.

2.Material and Methods

69 patients who visited the cardiology referral clinic at Digna Price Hospital in Port Sudan, Sudan, on warferin between May 2024 and December 2024 are the subjects of this convenient study. Each participant signed an informed consent form after being informed about the study's details. Age, sex, warferin dosage, and INR outcome.

the laboratory setting should be obtained through intravenous extraction and collected directly into a tube with a light blue top. This tube contains 3.2% sodium citrate as the anticoagulant. [10] The tubes must be filled to at least 90% of their total capacity. The tube should be gently inverted several times immediately after collection to ensure proper mixing of blood and anticoagulant. The total time between sample collection and testing should not exceed 24 h. [11]

Healthcare professionals should be vigilant when the specimen is obtained from a vascular-assisted device, as heparin contamination may reduce the reliability of INR measurement. [12] Capillary whole blood may be obtained from point of care (POCINR testing systems) through fingerstick, with the blood applied to a test strip or cartridge. The INR value from POC testing is acceptable if it does not deviate by more than ±0.5 INR units from the reference laboratory INR value. [13] Data analyzed with SPSS version 21.

The Digna Price Hospital provided a letter of authorization for the ethics committee.

3.Results

In all, 69 patients who took warfrine took part in the trial. This study demonstrates the relationship between the warfarine dosage used for various cardiovascular diseases and the INR result.

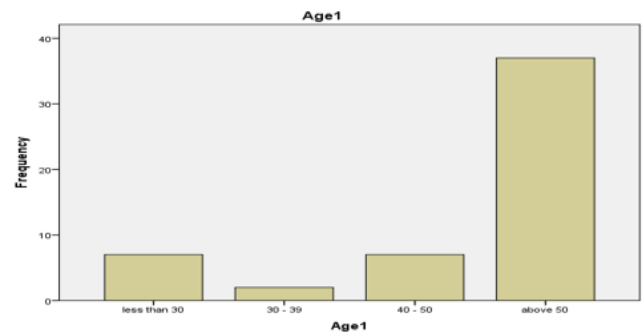The age distribution in this study is depicted in Figure (1), with the majority of patients being over 50.

Figure (1): Age distribution in this study

In this study, the distribution of males and females is equal figure (2).
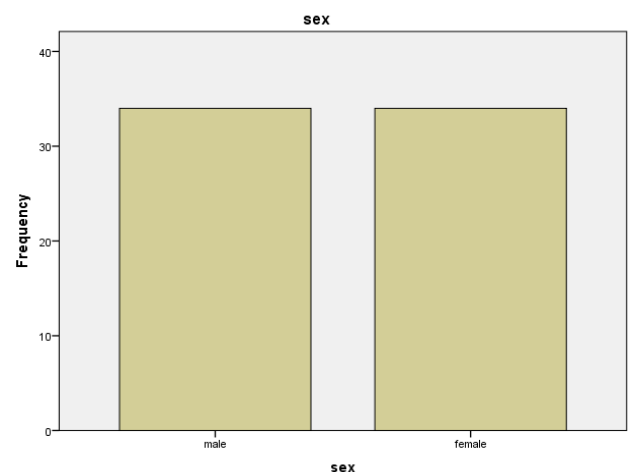

Figure (2): Sex distribution in this study

5 mg (27.5%) of warfrine was the typical dosage used (figure 3).
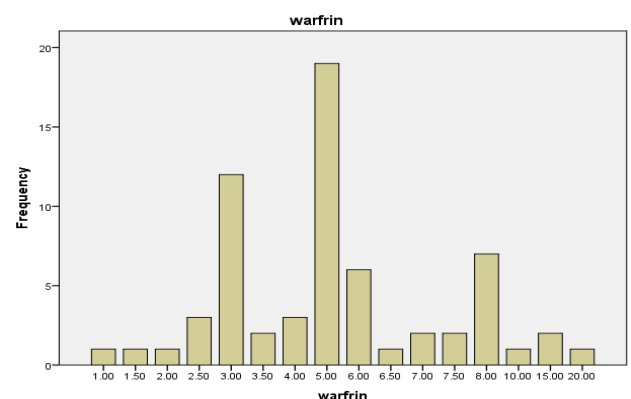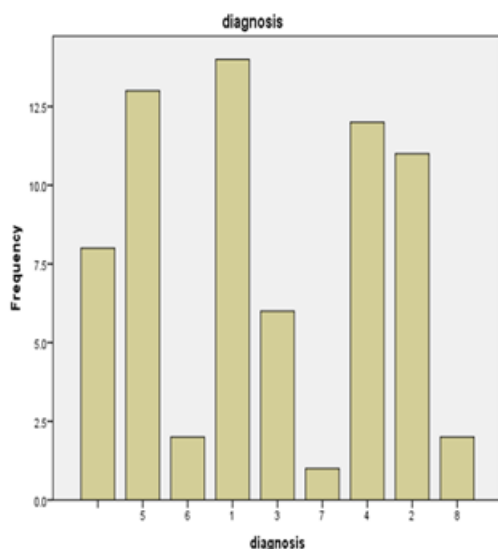

Figure (3): Warfrine dose in this study

Warfrine was frequently utilized in this study to mechanical valves, particularly the aortic valve (figure 4).

1	Aortic valve replacement (AVR)
2	Mitral valve replacement (MVR)
3	Double valve replacement (DVR)
4	Mitral stenosis (MS)
5	Atrial fibrillation (AF)
6	Atrial Septal Defect (ASD)
7	Left ventricular clot
8	Pulmonary embolism (PE)

Figure (4): The common indication for warfarine use in this study

Table 1 indicates that there was no significant correlation between age and the study's increased INR result (P value = 1.000).

Table (1): Relationship between age and increase INR result in this study.

Age gp	Std error	Sig
Less than 30	1.12178	1.000
30-39	1.12178	1.000
40-49	.74785	1.000
Above 50	.49648	1.000

Thirteen patients (11.3%) had an INR above the target, while the majority of patients in this group had an INR below target (34, 29.6%). There were only seven INR-controlled patients. Table (2).

Table (2): Show the INR on this study

INR	Frequency	Percentage %
<2	34	49.3
2-3	7	10.1
2.5-3.5	14	20.3
>3.5	13	18.8
Missing	1	1.4
Total	69	100

Table 3 indicates that there was no significant correlation between age and the study's increased warfrin dose result (P value = 1.000).

Table (3): Relationship between age and increase warfrin doseresult in this study

Age gp	Std Error	Sig
Less than 30	1.98596	1.000
30-39	1.98596	1.000
40-49	.1.32397	1.000
Above 50	1.02806	1.000

4.Discussion

This study used warfrine on 69 patients in an effort to determine whether there is a relationship between INR control and the age distribution, disease type, and sex of study participants.

There was no discernible correlation between patient age and INR control; however, the study's limited sample size was a disadvantage.

In this study, warfrin is frequently used to treat valve replacement, mitral stenosis, and atrial fibrillation.

Only 45.6% of individuals in different research with 298 patients the majority of whom were male achieved the desired INR range after having their valves replaced. This is a significant discovery that calls into question the standard of patient cares this clinic offers.

The rupture of atherosclerotic plaques increases the risk of myocardial infarction or stroke in patients with coronary heart disease and atherosclerosis. This patient group should initially benefit from a higher INR, which indicates a lower risk of thrombosis. Surprisingly, we find the opposite in our study. Higher mortality was linked to an increase in the INR. When the relationship between INR and mortality was examined throughout a range of INR values, it was found that the risk of death was somewhat higher for INR values below 1.0 but significantly higher for INR values above about 1.05 [14]

At the beginning of stroke, nearly 75% of our patients had an INR below the therapeutic limit. Some patients exhibited low medication compliance, while the remaining patients struggled to maintain therapeutic levels despite taking their medications as prescribed, making them insufficiently protected against stroke. [15-19]

The INR for the remaining 25% of individuals was ≥2.0. Even though many patients had one or more cardiovascular risk factors, it can occasionally be challenging to pinpoint the exact mechanism. For example, choosing a platelet inhibitor or anticoagulant medication can be challenging. This cannot be interpreted as an indeterminate cause or a double pathogenesis of stroke and atherothrombosis. Thus, because of underlying heart disease, patients experienced a cardioembolic stroke even though they were within the therapeutic range. [20]

A correlation between plasma warfarin levels and warfarin dose was discovered. Although there was a trend of rising INR with rising plasma warfarin level, there was no meaningful correlation between the two variables. These findings supported a prior study's conclusion that the INR is not significantly influenced by warfarin concentration. [21]

5.Conclusion

The majority of the 69 patients who took part in this trial were over fifty years old, and there was no discernible correlation between the age distribution and the INR Control.

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