SUDAN HEART JOURNAL | Official Journal of the Sudan Heart Society | ISSN 1858-6783 (Print) / 1858-6791 (Online)
Vol. 9, No. 2 (Summer 2021) • Manuscript: SHJ-2021-V9N2-01 • DOI: 10.25239/SHJ/Vol9/No2/Original1

Original Article

Anticoagulation in Prosthetic Mechanical Valves: Patient Knowledge, Adherence to Therapy and Adequacy of Anticoagulation

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Abstract

Cross-sectional study of 119 Sudanese patients with mechanical heart valves attending Al-Shaab and Ahmed Gasim anticoagulation clinics (June–September 2019). Mean age was 36 years (77.3% female), with mitral replacement in 60.5%. Although 90% achieved intermediate-to-high knowledge scores (AKT) and 89.1% reported high warfarin adherence (MMAS-8), only 14.3% achieved optimal Time in Therapeutic Range (>=70%).

Introduction

Valvular heart disease, especially rheumatic heart disease, is a major health problem in Sudan(1) . Warfarin is a widely used drug for the treatment and prevention of multiple disease states Such as atrial fibrillation , venous thromboembolism , and prosthetic heart valves. Despite the fact that the drug was introduced decades ago, it is still considered difficult to predict due to narrow therapeutic range (2).

Objective:

To study knowledge and adherence of patients with mechanical valves to oral anticoagulants as well as adequacy of anticoagulation and access to INR (International Normalized Ratio) testing

Methods:

This is cross-sectional, hospital based conducted at Shab teaching hospital cardiac surgery clinic and Ahmed Gasim Hospital anticoagulation clinic in Khartoum, Sudan. All adults (> 18 years of age) with surgically implanted mechanical heart valves were included from June to September 2019. Patients with tissue prosthetic valves or did not consent to the study were excluded. The data was collected using direct interview by the researcher and reviewing hospital records.

Variables studied were demographic variables namely age, gender, residence, level of education and clinical variables namely primary diagnosis, type of mechanical valve, type of oral anticoagulant, duration of treatment, type of follow up and frequency of INR testing.

Knowledge was assessed using the Oral Anticoagulation Knowledge Tool (AKT) developed by Obamiro et al (3). Adherence was assessed using the Morisky Medication Adherence Scale (MMAS-8) (4)

Adequacy of control will be estimated using the ordinary time in therapeutic range (TTR).

All data were entered in Microsoft office excel work sheet and statistical analysis was done using Statistical Package for Social Science (SPSS, ver. 25).

Ethical approval of the research was obtained from Sudan Medical Specialization Board Ethics Committee, Educational Development Center, from Ashab teaching hospital administration, and Ahmed Gasim hospital

administration. All patients were consented prior to data collection

Results

The study included 119 patients with implanted mechanical heart valves. Mean age was 36 (+/- 14.8) years and 77.3% were females and 26.7% were males.

Mechanical valves were implanted in the mitral area alone in 60.5% of cases, 22% in aortic area alone and 17.5% had both aortic and mitral mechanical valves. Figure 1 shows the different valve locations

Fig (1). Location of implanted mechanical valves. N=119

Of the total cohort, 65% resided within the state of Khartoum and 35% from other states.

Figure 2 shows education level of the different participants. Less than 20% had no any form of formal education.

Fig (2). Level of education of study cohort

Among the 119 participants about 40 % had their valve replaced in the last 6 years , with only one patient had has his valve replaced more than 25 years ago. Figure 3 shows distribution of time since implantation for mechanical valves.

Fig (3). Time from implantation of mechanical valves. Yr=year. N=119

Figure (4) shows the distribution of the AKT scores among the 119 participants With more than 47 % scored between (18-23).

Figure 4. Oral Anticoagulation Knowledge Kit score distribution. N=119

Figure (5) illustrate the distribution of the MMAS-8 score among the 119 participants; 89.1 % claimed the full score 8\8.

Fig (5). Distribution of MMAS-8 score amongst study population. MMAS-8= Morisky Medication Adherence Scale 8. N=119

TTR for the study group was < 30%, 31-49%, 50-69%, 70- 89%, 90-100% in 17.6%, 25.2%, 42.5%, 10.9%, and 3.8% respectively.

Discussion

The mean age of the study population is in the fourth decade of life reflecting the young age of the population and the predominant rheumatic heart disease as the main indication for valve replacement in Sudan.

The majority of the patients were female with the mitral valve replaced in more than 60 %. This reflects the predominance of RHD and its predilection for the mitral valve.

This in keeping with study conducted by Ahmed et al in 2016 , held at Ahmed Gasim INR clinic, which included 135 patients with female predominance of 73.3% , with mitral valve replacement being the most common indication for warfarin anticoagulation at 48.1%.In the same study, 85.2% resided in Khartoum state which higher than our study cohort (5).

The majority of the study cohort showed good level of knowledge as assessed by AKTT and similar to results by Elbur et al conducted in 2015.(6)

In this study the participants were adhered well to their medications with 89.1 % were highly adherent , this is in keeping with study conducted by Smet el al 2018. (7)

TTR was more than 50% in 57.2% of patients . Though the figure is somehow satisfying, however, measures must be taken to improve these figures.

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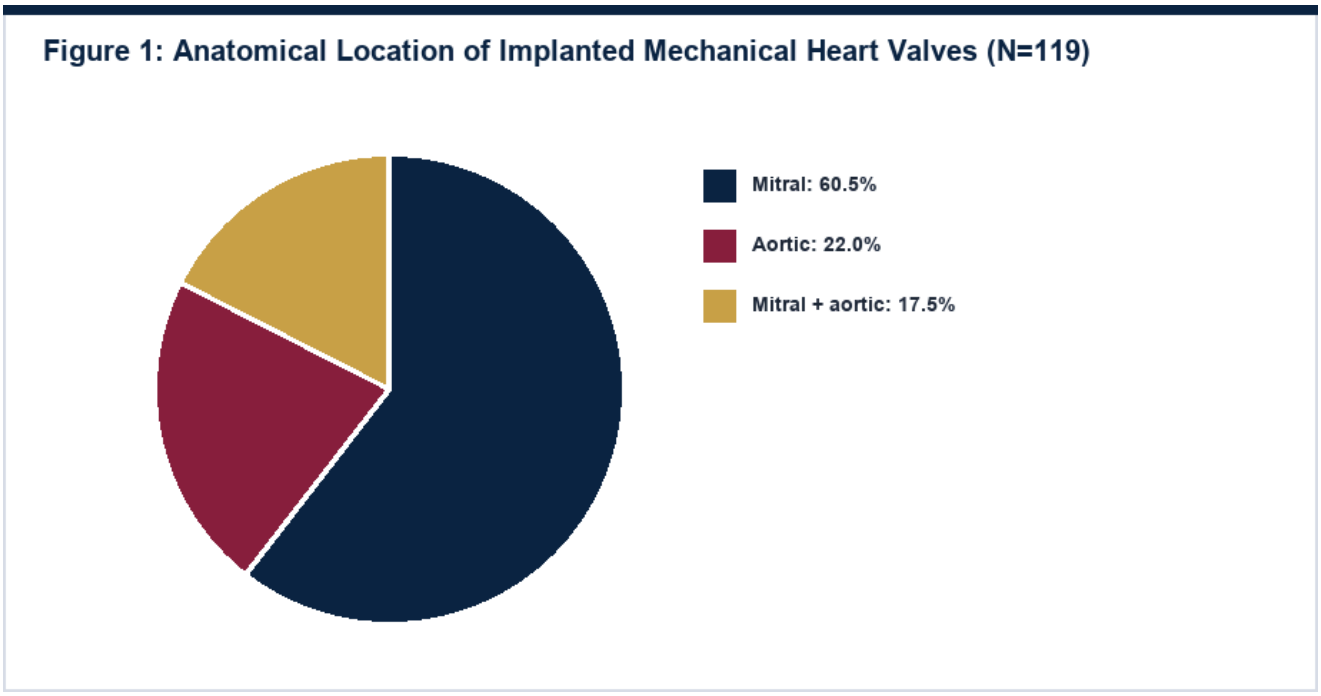


Figure 1: Anatomical Location of Implanted Mechanical Heart Valves (N=119)

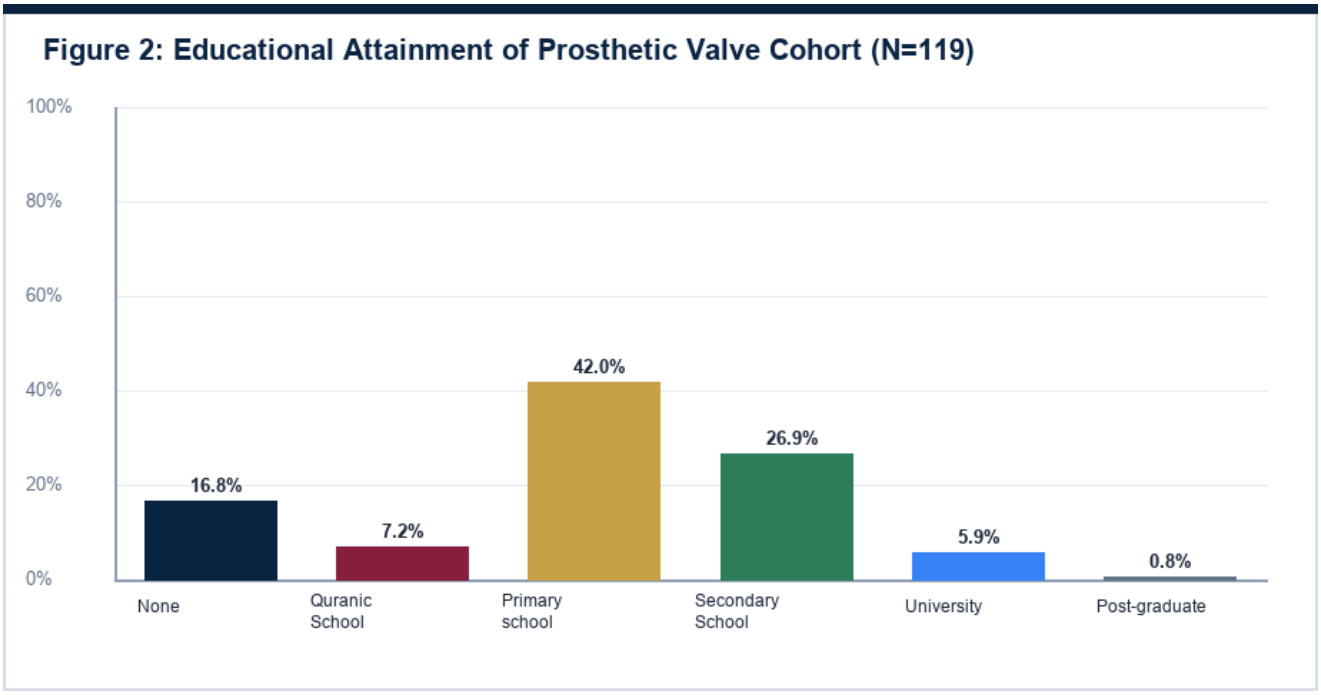


Figure 2: Educational Attainment of Prosthetic Valve Cohort (N=119)

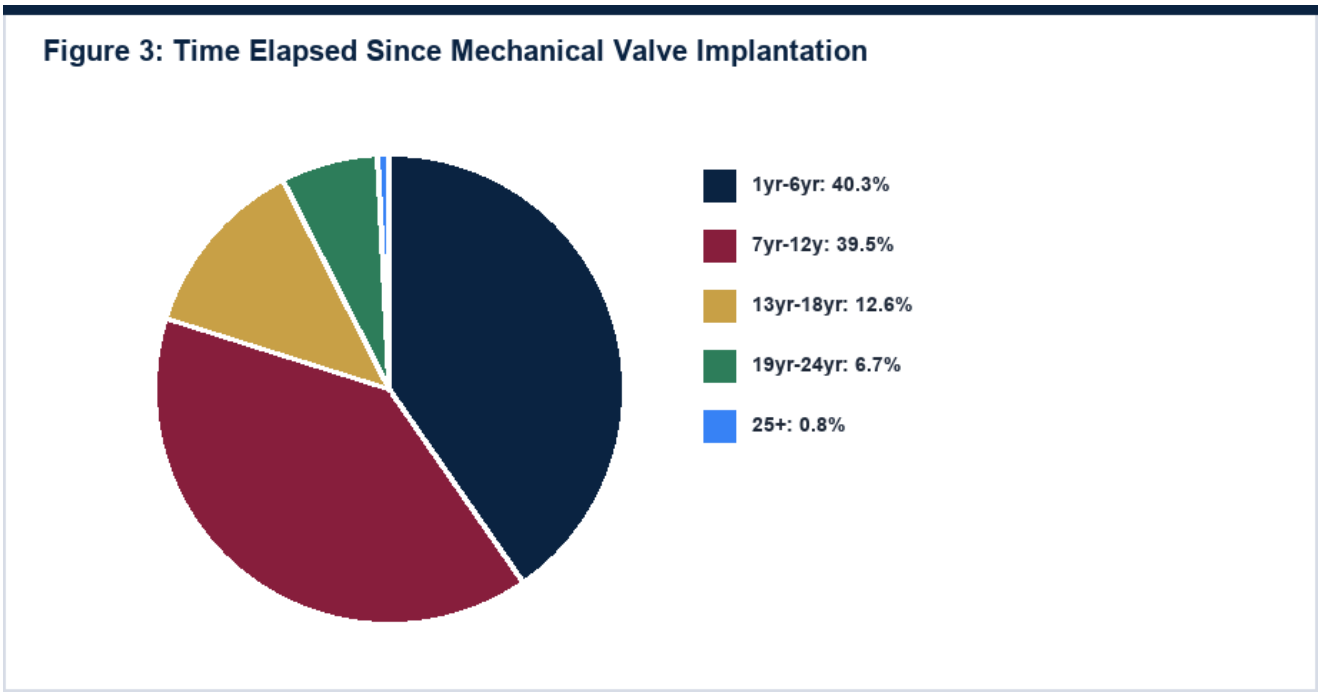


Figure 3: Time Elapsed Since Mechanical Valve Implantation

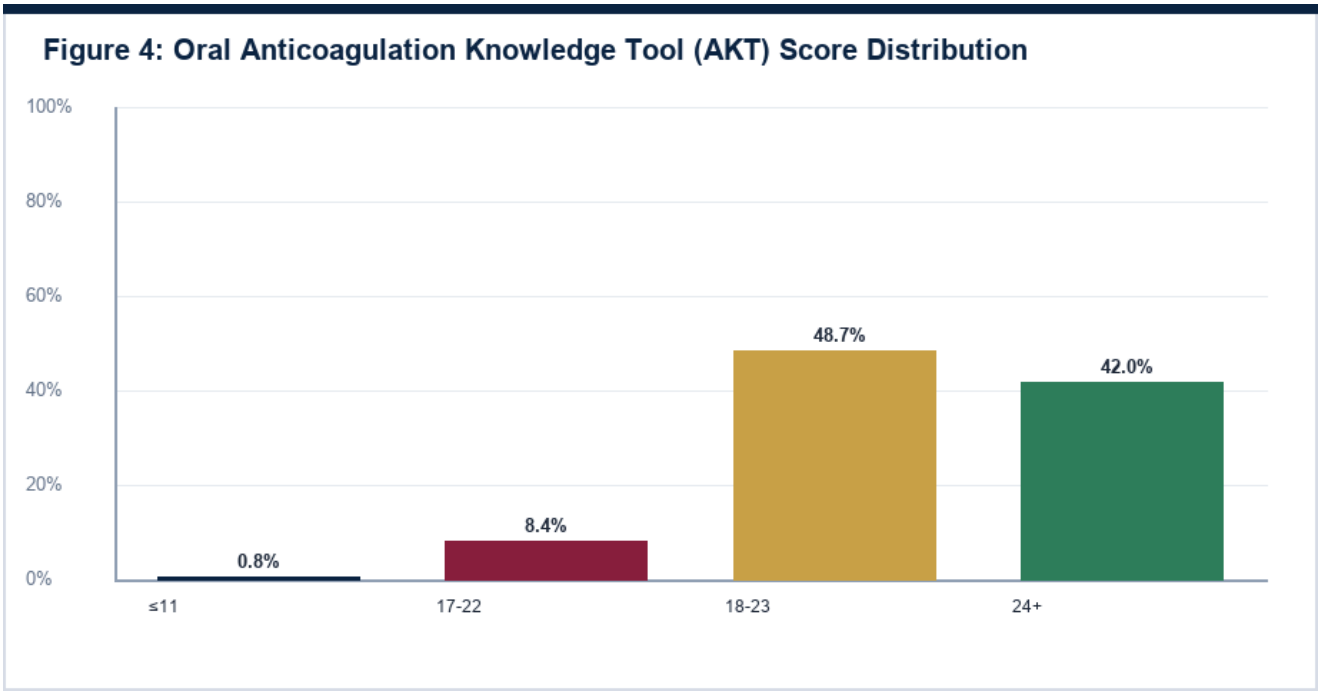


Figure 4: Oral Anticoagulation Knowledge Tool (AKT) Score Distribution

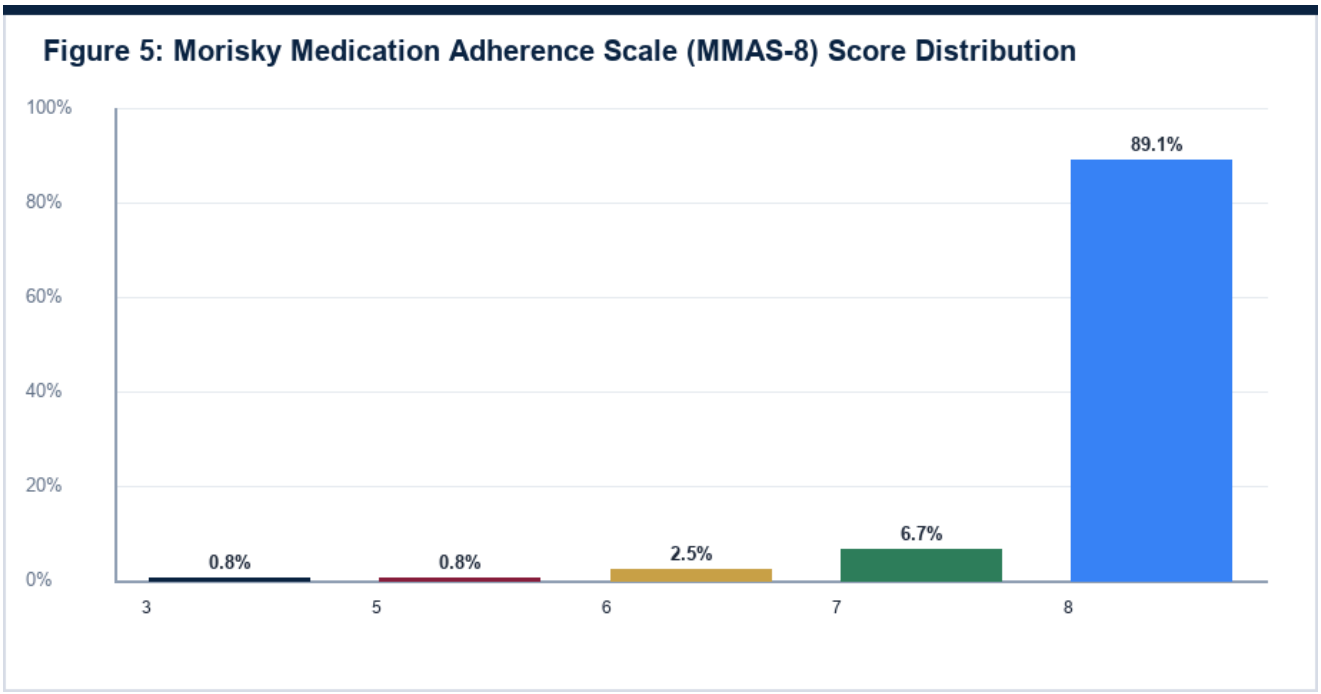


Figure 5: Morisky Medication Adherence Scale (MMAS-8) Score Distribution