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Knowledge and adherence to Warfarin's treatment regimen among patients in Alshaab and Ahmed Gasim Hospitals, Sudan, 2018

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ABSTRACT

OBJECTIVE

Warfarin is an oral anticoagulant drug that needs continuous clinical and laboratory monitoring due to its narrow therapeutic index and life-threatening complications. This study aims to assess knowledge and adherence of patients to their warfarin treatment regimen and to identify barriers that prevent patients to take their warfarin therapy regularly.

METHODS

In this cross-sectional study, a systematic random sample of 307 patients was selected from Alshaab teaching hospital heart section and Ahmed Gasim Hospital. Data was collected by anonymous interview-based questionnaire.

RESULTS

Male patients (52.5%) exceeded females (44.8%); the mean age was 48.79. About 57.98% of the studied patients had moderate overall knowledge score, and more than half of them had good adherence levels (62.2%). The study shows that: Forgetting (43.7%) was the main barrier preventing the patients from taking their medication, followed by drug unavailability (36.8%) and high cost (19.5%). There are statistically significant differences between patient's age/education and their level of knowledge (p=0.008/p=0.011). The correlations between patients' adherence to warfarin oral anticoagulant and their level of knowledge is statistically insignificant (r=0.647, p=0.739). There are significant association between patients' level of adherence and the time from which the patient starts to take warfarin (p-value= .034).

CONCLUSIONS

The majority of the studied patients had moderate overall knowledge score about Warfarin oral anticoagulant, and more than half of them had good adherence levels. "Forgetting" was the main barrier preventing the patients from taking their medication.

DESCRIPTORS

Warfarin, Knowledge, Adherence, Barriers.

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INTRODUCTION

Warfarin is an oral anticoagulant drug that needs continuous clinical and laboratory monitoring due to its narrow therapeutic index and life threatening complications[1]. The main purpose of its utilization is to maintain a certain level of anticoagulation effect as well as minimizing the risk of hemorrhagic complications. A patient's risk of either complication (thrombosis or hemorrhage) is determined by time and the extent that his or her international normalized ratio (INR) lies outside the suggested therapeutic range[2].

Warfarin prevents against thromboembolic complications of various conditions such as: stroke; atrial fibrillation; venous thromboembolism; and valvular heart disease[3]. Effective anticoagulation depends on demographic factors, patient education, drug knowledge and adherence[4].

In drug therapy, adherence is defined as the extent to which a person's medication taking behavior coincides with medical advice, the effectiveness of medication is determined by continuous adherence to it[5].

Non-adherent is usually unintentional, but is related to forgetting, unavailability of the drug, or being carless about the dosing schedule[6]. Drug cost is a great obstacle to adherence and should be contextualized mainly in developing countries, where access to drugs is often limited[7]. Non-adherence to medication increases the morbidities, mortalities, and costs of healthcare. Only 50% of patients with chronic diseases are adherent to their medication in developed countries as reported by WHO[8].

The aim of this study was to assess knowledge and adherence of patients to their warfarin treatment regimen and to identify barriers that prevent patients to take their warfarin therapy regularly.

METHODS

Study design

This is a descriptive cross sectional, hospital-based study.

Study area

The study was conducted at two public hospitals in Khartoum state-Republic of Sudan: i) Alshaab teaching hospital: is the main governmental hospital in Sudan specialized in cardiology, located in Army Ave Street, Khartoum, Sudan and ii) Ahmed Gasim hospital: located in Al Mauna Street, Bahri, Khartoum, Sudan.

Study population

Alshaab teaching hospital and Ahmed Gasim hospital patients on warfarin therapy.

Inclusion criteria

Any patient who uses warfarin as treatment.

Exclusion criteria
1 No consent.
2 Very ill patient.

Sample size

All patients on warfarin therapy in the two assigned hospitals at the time of the study were approached, 307 patients were reached.

Equation used: $n = Z^2 \frac{(p*q)}{d^2}$

where ;
n = minimum sample size required,
z = standard normal deviation at 95% confidence level (set at 1.96)
p = is the proportion in the target population estimated to have particular characteristic p= 50% (0.5),
q = 1-p,
d = degree of accuracy (set at 0.05)

$$n = (1.96)^2 \frac{(0.5*0.5)}{(0.05)^2} = 384.$$

The researcher collected 307 questionnaire results and couldn't complete the designated number of 384 due to difficult circumstances of Sudan latest revolution.

Sample selection

Sample design used: systemic random sampling.

Data collection

Data collection was done -by an anonymous, interviewer-based questionnaire. The questionnaire was translated into Arabic. It consists of three sections. The first section has items about socio-demographic characteristics, the second section has items about patient's knowledge to warfarin and the third section has items about warfarin adherence and perceived barriers preventing from taking their medication regularly. 14 items in the second section assess the respondents' degree of knowledge to their medication. Each item answered with "Yes" was given a score of 1 and "No" was given a score of zero. With high knowledge more than seventy-five percent (>= 75%), Moderate knowledge between fifty and seventy-five percent (>50%<75%) and Low knowledge less than fifty percent (<50%).

One item in the third section assesses the respondents' degree of adherence to their medication, by asking them whether they are taking their medication on time. Those who answered ''Yes'' known as adherent and ''No'' known as non-adherent.

Data analysis

The Data was tabulated, and the collected data were entered into Microsoft excel database and analyzed using statistical package for social sciences "SPSS" v23. Descriptive statistics also were used to compute means and standard deviations for numerical variables, as well as frequencies for numerical and ordinal variables. Association with chi-square cross-tabulation with significance value of 0.05.

Ethical concern

An ethical approval was obtained from Department of Community Medicine-University of Khartoum, Ministry of Health and hospitals administers. Before data collection, each participant was clearly informed about the objectives of the study and verbal consent was obtained. With assurance that no information that can lead to identification of a specific subject will be taken.

RESULTS

Socio-demographic Characteristics of the participants at Alshaab teaching hospital and Ahmed Gasim hospital

Male patients (51.5%) exceed females (48.5%). The mean age was 48.79(±7) years. Most of the studied patients (69.4%) are married, while only 3.6% of them hold bachelor's degree. The majority (37.8%) of the studied populations are house-

wives, while 31.9 % of them have employee work. Also, most of them (62.2%) live in urban areas. About (67.8%) go to hospital for follow up. 73% have distance more than 5 kilometers to go for follow up Table 1.

Table 1. Distribution of Studied Participants' According to Their Socio-Demographic Characteristics (n=307).

Socio-demographic characteristics	No N = 307	Percent %
Age:		
16-40	98	31.92
41-60	123	40.06
61-80	86	28.01
Mean(±SD)	48.79(±7)	
Gender		
Male	158	51.5
Female	149	48.5
Educational Level		
Illiterate	88	28.7
Primary	108	35.2
Secondary	75	24.4
Diploma	25	8.1
Bachelor	11	3.6
Occupation		
Employee	98	31.9
Housewife	116	37.8
Retired	41	13.4
Unemployed	52	16.9
Social Status		
Unmarried	42	13.7
Married	213	69.4
Divorced	5	1.6
Widowed	47	15.3
Residence		
Rural	116	37.8
Urban	191	62.2
Place to go for follow up		
Health Center	99	32.2
Hospital	208	67.8
Distance to go for follow up		
5 kilometers	41	13.4
More than 5 km	224	73
Less than 5 km	42	13.7

Most patients with bachelor's degree have high level of knowledge. However, there are no significant differences between the rest of socio-demographic characteristics and patients' level of knowledge Table 2.

Table 2. Relationships between Participants' Overall Knowledge Score to Warfarin and Their Socio-Demographic Characteristics (n=307).

Socio-demographic characteristics	Overall knowledge high	moderate	low	X^2	p-value
Age:					
16-40	35	54	9	13.799	.008*
41-60	52	64	7		
61-80	16	60	10		
Gender				.102	.950
Male	52	92	14		
Female	51	86	12		
Educational Level				10.840	.011*
Illiterate	17	64	7		
Primary	36	64	8		
Secondary	30	37	8		
Diploma	13	10	2		
Bachelor	7	3	1		
Occupation				7.684	.262
Employee	37	51	10		
Housewife	40	66	10		
Retired	7	31	3		
Unemployed	19	30	3		
Social Status				6.463	.373
Unmarried	18	23	1		
Married	68	123	22		
Divorced	2	2	1		
Widowed	15	30	2		
Residence				4.527	.104
Rural	31	76	9		
Urban	72	102	17		
Place to go for follow up				5.718	.057
Health Center	24	65	10		
Hospital	79	113	16		
Distance to go for follow up				1.146	.887
5 kilometers	13	23	5		
More than 5 km	77	130	17		
Less than 5 km	13	25	4		

Knowledge assessment about warfarin therapy among participants at Alshaab teaching hospital and Ahmed Gasim hospital

Total of 307 patients using warfarin therapy, (70.7%) know exactly why they are taking warfarin. (30.3%) of the patients know for how long they must take it. 258 patients (84%) did not know the term ''INR''. The other 49 patients (16%) were aware about it and know what INR showed in the last test. However only 42 of them answer that they know what their target INR is (table 2). (57%) of the patients know when their next blood test will be and (60.9%) know about change in warfarin dose. (62.2%) know that they must have record book and anticoagulant alert card for using warfarin. (51.8%) indicate that they know about warfarin-drug interaction. (62.5%) know that other oral anti-angulant should be used with caution when they are taking warfarin. (31.6%) don't know about food interaction. (37.1%) of the patients know bleeding and bruising as side effect of warfarin. (86.3%) were not aware about consulting doctor if they will have any dental or surgical procedure in the future. All the patients indicate that they know who to contact in case of emergency or any concerns about their treatment. The dose of warfarin being taken varied from patient to patient depending on INR level, in 62.9% the dose was between 1-5. Mean is (±4.031 SD) and standard deviation is (2.7194).

Majority of the patients 187 (57.98%) have Moderate overall knowledge. 103 patients (33.55%) have High knowledge and only 26 patients (8.46%) have Low knowledge.

There are high significant relationships between patient's age as well as educational level and their level of knowledge (X^2=13.799 & p=.008*, X^2=10.840 & p=.011*) respectively. Where most of the patients (40.06%) are between 41-60 years.

Assessment of adherence to warfarin therapy among the participants at Alshaab teaching hospital and Ahmed Gasim hospital

Total of 307 patients using warfarin therapy, 191 (62.6%) patients found adhere to their medication and 116 (37.8%) don't adhere to it Figure 1. Figure 1 There are no significance differences between the socio-demographic characteristics and patients' level of adherence Table 3.

Figure 1. Distribution of Adherence to Warfarin Therapy among Participants' in Alshaab Hospital and Ahmed Gasim Hospital (n=307).
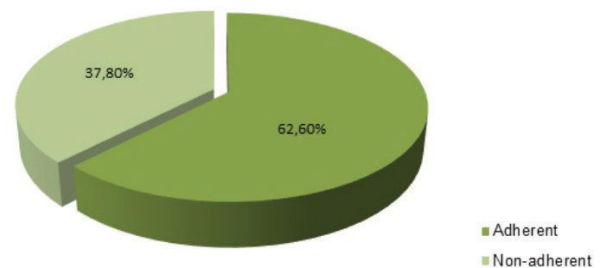

Table 3. Relationships between Participants' Adherence to Warfarin and Their Socio- Demographic Characteristics (n=307).

Socio-demographic characteristics	Adherence question adherence	No adherence	X^2	p-value
Age:			2.662	.264
16-40	67	31		
41-60	75	48		
61-80	49	37		
Gender			.027	.869
Male	99	59		
Female	92	57		
Educational Level			4.242	.374
Illiterate	52	36		

Primary	64	44		
Secondary	48	27		
Diploma	20	5		
Bachelor	7	4		
Occupation			.773	.856
Employee	61	37		
Housewife	70	46		
Retired	25	16		
Unemployed	35	17		
Social Status			2.403	.493
Unmarried	26	16		
Married	137	76		
Divorced	2	3		
Widowed	26	21		
Residence			.472	.492
Rural	75	41		
Urban	116	75		
Place to go for follow up			3.48	.062
Health Center	69	30		
Hospital	122	86		
Distance to go for follow up			.698	.705
5 kilometers	27	14		
More than 5 km	140	84		
Less than 5 km	24	18		

There is no significant correlation between patients' adherence to warfarin and their level of knowledge (r=0.647, p=0.739).

There is significant association between patients' level of adherence and the time from which the patient starts to take warfarin. Where most of the patients begun to use it for less than 1 year (X^2 = 4.534, p-value = .034*).

Barriers that prevent the participants to take warfarin regularly, at Alshaab teaching hospital and Ahmed Gasim hospital

139 patients (45.3%) answer that "Forgetting" was the main barrier preventing them from taking their medication regularly. About 117 patients (38.1%) choose drug unavailability as barrier. Also, High drug cost counted as barrier preventing 62 patients (20.2%) from medication. The last 4 patients (1.3%) answer others including not interested and I don't want to Table 4.

Table 4. Barriers That Prevented Participants from Taking Warfarin Regularly Among Participants' in Alshaab Teaching Hospital and Ahmed Gasim Hospital (n=307).

Barriers	No	%	Yes	%
Forget	168	54.7	139	45.3
High cost	245	79.8	62	20.2
Not available	190	61.9	117	38.1
Others (e.g. carelessness)	303	98.7	4	1.3

DISCUSION

The objectives of this study were to determine knowledge and adherence to warfarin therapy among patients in Alshaab teaching hospital and Ahmed Gasim hospital, Sudan. Also, to assess the perceived barriers that prevents them from taking their medication regularly.

In this study, 70.7% of the patients in Alshaab teaching hospital and Ahmed Gasim hospital knew the reason of taking warfarin. Similar to study in single community hospital in Malaysia which found 89% of patient's knew the reason of taking warfarin[2].

Previous literature indicates that monitoring the INR is the strongest prediction of warfarin activity[9]. Assuming a basic level of comprehension, healthcare professionals commonly use the term "INR" when discussing warfarin anticoagulation with their patients. However, 84% of patients in this study did not understand the meaning of INR. Like Waqas et. al study which found that 70% of the patients didn't know what is INR[2].

An additional area of concern is that about half of patients in this study indicated that they don't know that using warfarin compels them to change other medications because of drug interaction. This similar to the study in KSA which found that adequate knowledge of warfarin-drug interactions was lacking in about 50% of patients[11]. Also, A study of Waqas et. al which found that 56% didn't know about the interaction[2]. Because many drugs, foods, and herbal remedies interact with warfarin, emphasis must be placed on these potential interactions. The avoidance of agents with clotting-inhibitory activity such as: aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs) are of particular importance and must be stressed to all patients[12]. 62.5% of the patients knew about the cautious use of some anticoagulants -such as aspirin- when they are taken warfarin.

62.6% of the patients adhered to warfarin therapy. A study in Malaysia found that 76.1% had good adherence to warfarin[10]. A study of Waqas et. al found that 88% of the patients were adherent to warfarin[2]. A study in KSA found that 61.1% of the patients were found adherent to warfarin[4]. This could be related to the nature of the disease that necessitates drug adherence to avoid major complications. Contrary to these findings, 5.4% of the patients were found to be adherent to warfarin therapy in similar study in Sudan[13].

Regarding the barriers that prevent the patients to adhere to warfarin. Forgetting was the main reason (45.3%) followed by drug unavailability (38.1%) and high cost (20.2%). A study conducted in Malaysia found that from 12 patients (23.1%) had poor adherence, 10 patients (19.2%) Forgot to take medications, while the other 2 claimed that they had inadequate medications refill[10]. A study of Waqas et. al found that about 72% of patients reported forgetfulness as a reason for non-compliance[2]. A study in Australia found financial barriers included cost of travel, medication cost as barriers to adherence to anticoagulation therapy[14]. Although Sudan is considered as a poor country, drug cost was not found to be the main barrier that prevented patients to adhere to warfarin.

On studying the relationships between patients' socio-demographics and their level of knowledge related to warfarin, this study findings showed that there were significant relationships between patient's age and their level of knowledge, as patients in the middle age had moderate level of knowledge (p=.008). This is like study in Alexandria which found that there are significant association between age and level of knowledge[17] and Omair et al (2016) who found that patients, who had fair knowledge, were in the middle age group[18]. However, there are no other significant relationships between patients' socio-demographics characteristics and their level of knowledge.

The findings displayed that there were significant relationships between patients' educational level, and their level of knowledge. This is similar to study in Alexandria[15] and Omair et al (2016) found that patients who achieved fair knowledge, had high education, although knowledge's association with level of education was insignificant[16]. This could be related to better understanding of the medication as prescribed by physician in patients with good educational level.

There are positive significant correlations between patients' adherence to warfarin and the time from which the patient starts to take warfarin. In the same vein study in Brazil found that those who spent less on the drug had better adherence and remained more stable[17].

An important factor in warfarin therapy success is adherence of patients, which is based on adequate knowledge to avoid serious complications. This study revealed moderate level of patients' overall knowledge related to warfarin therapy. Moreover, more than half of the studied patients had good adherence levels.

LIMITATIONS

The study is cross-sectional, which limits the establishment of cause-and-effect relationship between exposure and out-

come. The researcher didn't use Morisky scale for adherence due to some issues. Didn't revise the patient's records and depend on patients' answer which sometimes may be misleading.

CONCLUSION

Most of the studied patients had moderate overall knowledge score about warfarin oral anticoagulant, and more than half of them had good adherence levels. Results highlighted positive significant correlations between patient's age/education and their level of knowledge (p=.008, p=.011). Also, there are significant association between patients' level of adherence and the time from which the patients start to take warfarin (p-value=.034). Whereas no significant correlations between patients' adherence to warfarin and their level of knowledge. "Forgetting" was the main barrier preventing the patients from taking their medication, followed by dug unavailability and high cost.

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