



Analysis of Drug Compliance among Patients Suffering from Deep Vein Thrombosis

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Authors' contributions

This work was carried out in collaboration among all authors. Author SA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors KM, JR, MAA, QS and AA managed the analyses of the study and managed the literature searches. Authors AMS and AA performed the statistical analysis. All authors read and approved the final manuscript.

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ABSTRACT

Objective: The objective of current research was to identify the compliance of commonly prescribed antithrombotic drug among patients who suffering from Deep Vein Thrombosis (DVT).

Methodology: Descriptive cross-sectional research on adults with age of 18-65 years suffering from DVT were conducted on medicine department of Shaheed Mohtarma Benazir Bhutto Medical University Hospital of Larkana. Three hundred and forty eight DVT patients were consecutive selected during the period of six months from January 2021 to June 2021. Data of DVT patients

was collected by using standard proforma and analyzed with statistical package of social sciences (SPSS) version 25.

Results: Majority of DVT patients evaluated during study period were male 237 (61.7%) patients and 147 (38.3%) DVT patients were female. Mean age of DVT patients was 43.78 ± 12.43 (18-65) years. Most of the patients were in age group of 51-65 years having 126 (32.8%) patients followed by 41-50 years having 104 (27.1%) patients, 31-40 years having 93 (24.2%) patients and 18-30 years having 61 (15.9%) patients. Majority of DVT patients were from urban areas 217 (56.5%) patients followed by rural areas 167 (43.5%) patients. Drug compliance in illiterate patients was 107 (36.1%). Drug compliance in indoor job patients was 102 (34.5%) whereas drug compliance in jobless patients was 59 (19.1%). Drug compliance in positive medication history was 207 (69.9%). Drug compliance in Hypertensive patients was 33 (11.1%) in congestive heart failure patients 27 (9.1%), in ischemic stroke 15 (5.1%). Whereas, the drug compliance among diabetes mellitus patients was 13 (4.4%). Overall drug compliance with antithrombotic drugs was reported in 296 (77.1%) DVT patients.

Conclusion: Current research concludes that rate of drug compliance was high in patients of DVT with rivaroxaban followed by warfarin and heparin, whereas long duration of therapy, polypharmacy, side effects of therapy, cost of therapy, continuous monitoring, injectables, diet restrictions and ADRs of therapy were the most commonly reported factors of non-compliance.

Keywords: Deep venous thrombosis; compliance; mortality; antithrombotic drugs.

1. INTRODUCTION

Thrombosis term is most commonly used for formation of abnormal mass from blood constituents in vascular system. If the process of thrombosis is observed in deep veins of body then it is known as deep vein thrombosis (DVT). In majority of cases deep vein thrombosis is formed in legs but it can also be observed either in veins of arms or in mesenteric veins or in cerebral veins [1-3].

It is a most common and important disease, considered as a part of venous thromboembolic disease (VTE). Venous thromboembolism diseases are considered as severe public health problem because of its significant association with increased rate of morbidity and mortality. It is enlisted as third common cause of mortality among cardiovascular diseases (CVDs) [3-5].

Deep venous thrombosis is disease of adults and rarely reported in children. Risk of deep venous thrombosis increased with increasing age (> 40 years). It is equally affecting the both male and female population. Different studies from United States of America (USA) reported that risk of development of deep vein thrombosis and its complications is higher in white peoples, in Africans and in Americans as compared to Asians and Hispanics [6-8]. Patients of deep vein thrombosis were clinically assessed for different clinical sign and symptoms for confirmation of diseases. However, 50% of sign and symptoms are reported in deep vein thrombosis. Some of

the commonly observed symptoms of deep vein thrombosis are; Edema: It is the most commonly reported symptoms (approximately in 80% of cases) of deep vein thrombosis. Tenderness: It is the second most commonly reported symptoms (approximately in 75% of cases) of deep vein thrombosis. Pain: It is reported approximately in 50% cases of deep vein thrombosis. Redness or discoloration of the skin at site of deep vein thrombosis. Erythema or hotness of skin at site of deep vein thrombosis.

Approximately 70% patients of deep vein thrombosis are suffering from acute episode of disease in which symptoms disappears after successful treatment of the disease, whereas in remaining 30% patients of deep vein thrombosis are suffering with additional symptoms such as; breakdown of skin and painful ulcers. Besides that, patients who are experiencing their first episode of deep vein thrombosis are at a higher risk of subsequent episodes of disease throughout their lives [9-13]. In year 1856, triad of Virchow or Virchow's triad was described that explained the three different categories responsible for development of thrombosis. These three contributing factors of thrombosis formation are playing vital role in formation of thrombosis. First contributing factor of Virchow's triad was venous stasis, second factor was vessel wall injury and third last factor was hypercoagulability. The process of venous stasis is more significant among all three contributing factors but alone can't develop thrombus [14]. However, risk of thrombus formation increased,

in existence of venous stasis along with vessel wall injury or hypercoagulability [15,16].

2. METHODOLOGY

Design of current hospitalbased study was descriptive cross-sectional.

2.1 Sample Size

For calculating sample size of research, online software of sample size calculation was used i.e., "OpenEpi". It is an open source software used for epidemiologic statistics in studies related to public health. In this research, population of Larkana (490,508) was used as prevalence for calculation of sample size. Calculated sample size for research was "348" with confidence interval (CI) of 95% and margin of error (MOE) 5%.

Online calculation of sample size obtained from Open Epi was described in Chart 1.

2.2 Data Collection Method

Before collection of data from patients of deep vein thrombosis, study approval was obtained from the Registrar of tertiary care hospital of Larkana. A specially designed questionnaire was used for interviewing enrolled patients and for collection of data.

At the end of interview, each patient was properly counseled about the appropriate use of medications in order to increase the compliance with medications and decrease the failure of therapy.

2.3 Statistical Analysis

Collected data was interpreted with latest version 25.0 of SPSS.

Sample Size for Frequency in a Population

Population size(for finite population correction factor or fpc)(N):	490508
Hypothesized % frequency of outcome factor in the population (p):	50%+/-5
Confidence limits as % of 100(absolute +/- %)(d):	5%
Design effect (for cluster surveys-DEFF):	1

Sample Size(n) for Various Confidence Levels

ConfidenceLevel(%)	Sample Size
95%	384
80%	165
90%	271
97%	471
99%	663
99.9%	1081
99.99%	1510

Equation

$$\text{Sample size } n = \frac{[DEFF * N * p(1-p)]}{[(d^2 / Z^2_{1-\alpha/2} * (N-1) + p * (1-p)]}$$

Results from OpenEpi, Version 3, open source calculator--SSPropor

Print from the browser with ctrl-P

or select text to copy and paste to other programs.

Chart.1. Sample Size Calculation

3. RESULTS

3.1 Overall Drug Compliance

Overall drug compliance with all three selected drugs were present in 296 (77.1%) patients and non-compliance was present in 88 (22.9%) patients.

3.2 Drug Compliance with Gender of DVT Patients

Drug compliance was 183 (61.8%) in male patients and 113 (38.2%) in female patients. Drug non-compliance was 54 (61.4%) in male patients and 34 (38.6%) in female patients.

3.3 Drug Compliance with Age of DVT Patients

Drug compliance was distributed into following age groups; in 18-30 years having 48 (16.2%) patients, in 31-40 years having 69 (23.3%) patients, in 41-50 years having 84 (28.4%) patients and in 51-65 years having 95 (32.1%) patients. Drug non-compliance was distributed into following age groups; in 18-30 years having 13 (14.8%) patients, in 31-40 years having 24

(27.3%) patients, in 41-50 years having 20 (22.7%) patients and in 51-65 years having 31 (35.2%) patients.

3.4 Drug Compliance with Resident of DVT Patients

Drug compliance in rural area patients was 132 (44.6%) and in urban area patients was 164 (55.4%). Drug non-compliance in rural area patients was 35 (39.8%) and in urban area patients was 53 (60.2%).

3.5 Drug Compliance with Education of DVT Patients

Drug compliance in different educated patients was distributed into following categories; in illiterate 107 (36.1%) patients, in primary 52 (17.6%) patients, in matric 70 (23.6%) patients, in intermediate 43 (14.5%) patients, in graduate 18 (6.1%) patients and in masters 6 (2.0%) patients. Drug non-compliance in different educated patients was distributed into following categories; in illiterate 30 (34.1%) patients, in primary 14 (15.9%) patients, in matric 19 (21.6%) patients, in intermediate 18 (20.5%) patients, in graduate 5 (5.7%) patients and in masters 2 (2.3%) patients.

Table 1. Overall Drug Compliance

Overall		Drug Compliance			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compliance	296	77.1	77.1	77.1
	Non-Compliance	88	22.9	22.9	100.0
	Total	384	100.0	100.0	

Table 2. Drug Compliance with Gender of DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
Gender	Male	183	61.8%	54	61.4%
	Female	113	38.2%	34	38.6%
	Total	296	100.0%	88	100.0%

Table 3. Drug Compliance with Age of DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
Age	18-30	48	16.2%	13	14.8%
	31-40	69	23.3%	24	27.3%
	41-50	84	28.4%	20	22.7%
	51-65	95	32.1%	31	35.2%
	Total	296	100.0%	88	100.0%

Table 4. Drug Compliance with Resident of DVT Patients

		Compliance			
		Compliance (%)		Compliance (%)	
Resident	Rural	132	44.6%	35	39.8%
	Urban	164	55.4%	53	60.2%
	Total	296	100.0%	88	100.0%

Table 5. Drug Compliance with Education of DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
Education	Illiterate	107	36.1%	30	34.1%
	Primary	52	17.6%	14	15.9%
	Matric	70	23.6%	19	21.6%
	Intermediate	43	14.5%	18	20.5%
	Graduate	18	6.1%	5	5.7%
	Masters	6	2.0%	2	2.3%
	Total	296	100.0%	88	100.0%

Table 6. Drug Compliance with Employment of DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
Employment	Indoor	102	34.5%	29	33.0%
	Outdoor	69	23.3%	27	30.7%
	Jobless	59	19.9%	13	14.8%
	House wife	66	22.3%	19	21.6%
	Total	296	100.0%	88	100.0%

Table 7. Drug Compliance with Medication History of DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
History	Yes	207	69.9%	56	63.6%
	No	89	30.1%	32	36.4%
	Total	296	100.0%	88	100.0%

Table 8. Statistical Analysis of Drug Compliance with Medication History of DVT Patients

	Chi-Square Tests		
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.246 ^a	1	0.264
Continuity Correction ^b	0.971	1	0.324
Likelihood Ratio	1.224	1	0.268
Fisher's Exact Test			
Linear-by-Linear Association	1.243	1	0.265
N of Valid Cases	384		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 27.73.

b. Computed only for a 2x2 table

3.6 Drug Compliance with Employment of DVT Patients

Drug compliance in indoor job patients was 102 (34.5%), in outdoor job patients was 69 (23.3%), in jobless patients was 59 (19.9%) and in house wife patients was 66 (22.3%). Drug non-compliance in indoor job patients was 29 (33.0%), in outdoor job patients was 27 (30.7%), in jobless patients was 13 (14.8%) and in house wife patients was 19 (21.6%).

3.7 Drug Compliance with Medication History of DVT Patients

Drug compliance in positive medication history patients was 207 (69.9%) and in without medication history patients was 56 (63.6%). Drug non-compliance in positive medication history patients was 56 (63.6%) and in without medication history patients was 32 (36.4%).

3.8 Drug Compliance with Hypertension in DVT Patients

Drug compliance in hypertensive patients was 33 (11.1%) and in non-hypertensive patients was

263 (88.9%). Drug non-compliance in hypertensive patients was 11 (12.5%) and in non-hypertensive patients was 77 (87.5%).

3.9 Drug Compliance with CHF in DVT Patients

Drug compliance in CHF patients was 27 (9.1%) and in non-CHF patients was 269 (90.9%). Drug non-compliance in CHF patients was 4 (4.5%) and in non-CHF patients was 84 (95.5%).

3.10 Drug Compliance with IS in DVT Patients

Drug compliance in IS patients was 15 (5.1%) and in non-IS patients was 281 (94.9%). Drug non-compliance in IS patients was 7 (8.0%) and in non-IS patients was 81 (92.0%).

3.11 Drug Compliance with DM in DVT Patients

Drug compliance in DM patients was 13 (4.4%) and in non-DM patients was 283 (95.6%). Drug non-compliance in DM patients was 4 (4.5%) and in non-DM patients was 84 (95.5%).

Table 9. Drug Compliance with Hypertension in DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
HTN	Yes	33	11.1%	11	12.5%
	No	263	88.9%	77	87.5%
	Total	296	100.0%	88	100.0%

Table 10. Statistical Analysis of Drug Compliance with Hypertension in DVT Patients

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.122 ^a	1	0.727
Continuity Correction ^b	0.025	1	0.874
Likelihood Ratio	0.120	1	0.729
Fisher's Exact Test			
Linear-by-Linear Association	0.122	1	0.727
N of Valid Cases	384		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.08.
b. Computed only for a 2x2 table

Table 11. Drug Compliance with CHF in DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
CHF	Yes	27	9.1%	4	4.5%
	No	269	90.9%	84	95.5%
	Total	296	100.0%	88	100.0%

Table 12. Statistical Analysis of Drug Compliance with CHF in DVT Patients

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.914 ^a	1	0.167
Continuity Correction ^b	1.347	1	0.246
Likelihood Ratio	2.153	1	0.142
Fisher's Exact Test			
Linear-by-Linear Association	1.909	1	0.167
N of Valid Cases	384		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.10.

b. Computed only for a 2x2 table

Table 13. Drug Compliance with IS in DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
IS	Yes	15	5.1%	7	8.0%
	No	281	94.9%	81	92.0%
	Total	296	100.0%	88	100.0%

Table 14. Statistical Analysis of Drug Compliance with IS in DVT Patients

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.047 ^a	1	0.3
Continuity Correction ^b	0.58	1	0.4
Likelihood Ratio	0.97	1	0.3
Fisher's Exact Test			
Linear-by-Linear Association	1.04	1	0.3
N of Valid Cases	384		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.04.

b. Computed only for a 2x2 table

Table 15. Drug Compliance with DM in DVT Patients

		Compliance			
		Compliance (%)		Non-Compliance (%)	
DM	Yes	13	4.4%	4	4.5%
	No	283	95.6%	84	95.5%
	Total	296	100.0%	88	100.0%

Table 16. Statistical Analysis of Drug Compliance with DM in DVT Patients

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	0.004 ^a	1	0.95
Continuity Correction ^b	0	1	1
Likelihood Ratio	0.003	1	0.95
Fisher's Exact Test			
Linear-by-Linear Association	0.003	1	0.95
N of Valid Cases	384		

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.90.

b. Computed only for a 2x2 table

4. DISCUSSION

Therefore, current cross-sectional research was designed in setting of tertiary care hospital of Larkana, where diagnosed patients of DVT were enrolled from medicine department and evaluated for patients drug compliance with commonly used antithrombotic drugs in DVT patients.

In current research three hundred and forty eight patients of DVT were evaluated, among which majority of DVT patients were male 237 (61.7%) patients and remaining were female 147 (38.3%) patients. Similar study by Amiwero, C., et al., also reported the 62.5% male DVT patients and 37.9% female DVT patients [17]. Another similar study conducted in Pakistan by Zamir, Q., et al., also reported the 59% male DVT patients and 41% female DVT patients [18]. Another Pakistani study by Arsh, A., et al., also reported the much higher 75.7 male DVT patients and lower 24.3% female DVT patients [19]. All of the similar studies are showing that male patients are mostly suffering from DVT as compared to female patients.

In current research mean age of DVT patients was 43.78 ± 12.43 (18-65) years. Most of the patients were in age group of 51-65 years having 126 (32.8%) patients followed by 41-50 years having 104 (27.1%) patients, 31-40 years having 93 (24.2%) patients and 18-30 years having 61 (15.9%) patients. Similarly, Amiwero, C., et al., reported the 61.2 ± 15.3 years [17], Lazo-Langner, A., et al., 73.89 ± 5.53 years [18], Ahmad, T., et al., 71 ± 13.34 years [20] and Deitelzweig, S., et al., 64.3 ± 16.8 years [21] mean age of DVT patients. All of the similar studies are showing that adults with age > 60 years were suffering from DVT patients. Difference in mean age of DVT patients was observed due to difference in age group of patients selected for study.

In current research majority of DVT patients were from urban areas 217 (56.5%) patients followed by rural areas 167 (43.5%) patients. A similar study by Lazo-Langner, A., et al., also reported the higher DVT patients from urban areas 78.43% followed by 21.57% DVT patients from rural areas [18]. Both studies are showing that most of the DVT patients were from urban areas as compared to rural areas.

In current research majority of DVT patients were illiterate having 137 (35.7%) patients followed by

matric having 89 (23.2%) patients, primary having 66 (17.2%) patients, intermediate having 61 (15.9%) patients, graduate having 23 (6.0%) patients and masters having 8 (2.1%) patients. A similar Pakistani study by Arsh, A., et al., also reported the higher prevalence of uneducated patients 48.4% [19]. Both Pakistani studies are reporting the higher prevalence of illiteracy in DVT patients.

In current research hypertension was the most commonly reported comorbidity in 44 (11.5%) DVT patients, followed by congestive heart failure in 31 (8.1%) DVT patients, ischemic stroke in 22 (5.7%) DVT patients and diabetes mellitus in 17 (4.4%) DVT patients. A similar Pakistani study by Ahmad, T., et al., reported the hypertension in 9.52% DVT patients, ischemic heart disease in 4.76% DVT patients and DM in 3.84% DVT patients [20]. Another study by Kang, J. M., et al., reported the hypertension in 33.15% DVT patients, DM in 14.3% DVT patients, ischemic heart disease in 3% DVT patients [23]. Another study by Demelo-Rodríguez, P., et al., also reported the hypertension in 43.2% DVT patients, DM in 11.7% DVT patients and ischemic heart disease in 7.2% DVT patients [24]. All studies are reporting the hypertension, diabetes mellitus, and ischemic stroke as a major risk factor for DVT.

In current research overall drug compliance with antithrombotic drugs was reported in 296 (77.1%) DVT patients, A similar study by Kang, J. M., et al., reported the overall drug compliance 93.8% with antithrombotic drugs [23].

5. CONCLUSION

Current research conclude that rate of DVT is high in male patients as compared to female patients. DVT is a disease of elder age. Its rate is increasing with increasing age and especially age > 60 years that increases the risk of complications and makes difficult management of DVT. Approximately one third reported patients of DVT were uneducated or illiterate that increases the risk of non-compliance with DVT therapy. Approximately seventy percent of DVT patients reported the history of medications and forty five percent reports the family history of DVT. Most commonly reported comorbidity in DVT patients was hypertension followed by congestive heart failure, ischemic stroke and diabetes mellitus. Overall drug compliance with antithrombotic drugs was approximately seventy seven percent in DVT patients.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline Patient's consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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