

## Mini Review

### National pharmacy anticoagulation program at Ministry of Health in Saudi Arabia

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#### Abstract

The National anticoagulation program founded in 2012 by Ministry of Health in Saudi Arabia. It organized by General Administration of Pharmaceutical care. It required of domestic and international hospital accreditation institutions. The program is crucial to prevent medication drug problems, improve patient morbidity and mortality with avoiding addition economic burden on health care system. The program consisted all patient hospitalization stages emergency visit, ambulatory care visit, hospital admission, and discharge. It started with governmental institutions then expand to primary care centers and privates institutions. The strategic program plan for coming years with policy and procedures and key performance indicators to follow the program implementation. The program is currently is a different national wise and without resembling at Gulf or Middle East countries. Anticoagulation program highly demands with a crucial role of pharmacist of lead and implementing the new program at Ministry of Health institutions in Saudi Arabia

**Keywords:** Anticoagulation; Pharmaceutical Care; Pharmacy; Ministry of Health; Saudi Arabia

#### Introduction

In between 2008-2012, the author was director of regional Drug Information Center at the biggest hospital of MOH (1400) beds. The authors and his team established Anticoagulation program at the hospital. The program consisted of six Anticoagulation guidelines the team designed them as physician order form. Any physician used to fill the form as a prescription. They included physician of heparin, physician order of warfarin, physician order of Anticoagulation bridging therapy, physician order of heparin-induced thrombocytopenia Therapy, and Physician order of prevention thrombosis. Each format had an indication, medication listed as the first line, seconded line and third option, each with specific drug dosing in normal function and kidney failure. All those orders approved by hospital pharmacy and therapeutic committee, medical director, and CEO of the hospital. Also, the drug information center made educational material for any patient

received Anticoagulation medication. The program activated in 2010 and still running until now.

#### The benefit of Pharmacy Anticoagulation Program

The national and international institutions of hospital accreditation required to implement the anticoagulation program [1-2]. In national data in United States of America, more than millions of patient records either hospital admission, emergency or ambulatory care visit had reviewed of Venous thrombosis risk over five years 2001-2005 and compliance of 6<sup>th</sup> American College of Chest Physician guidelines of prevention of venous thromboembolism Anticoagulation program are very high demand. The authors found more 50% non-adherence of the guidelines with several types of non-compliance started late, started late and ended early, or ended early [3]. A large multicenter study with more than thirty countries and 68 thousand medical or surgical patients. The author found 64% at risk for VTE for surgical patient and 59% of them received ACCP recommended VTE prophylaxis, and 42% at risk for VTE for a medical patient and 40% of them received ACCP recommended VTE prophylaxis [4]. In a local study, the author found a significant difference in the case facilities between whom received VTE prophylaxis and without prophylaxis [5]. With the high risk of mortality of VTE, most of the counties started the very comprehensive anticoagulation program and decreased the morbidity and mortality of that are events. In the systemic review study through Cochrane database, the authors found there is a

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significant improvement of VTE prescribing by education and alert system intervention [6]. The outcomes of the implementation of anticoagulation guidelines in Saudi Arabia measured through a study conducted at medical intensive care unit. The authors found a significant reduction incidence of VTE [7]. Also, the economic burden is very crucial, the average cost per each VTE events in range (898-20,994) USD while the estimated cost avoidance of anticoagulation implementation program in Saudi Arabia was (27,370,492.3/year) USD [8-9].

### The Pharmacist-Directed Anticoagulation Program

All mention anticoagulation guidelines implemented by physicians. While the potential pharmacist role of coordinate and implement anticoagulation protocols at hospital practice. The pharmacist organizes the Anticoagulation program well established in several counties. The pharmacist organizes the Anticoagulation program well established in several counties. For instance; in the United State of America (USA) started the pharmacist-directed anticoagulation program in the 1980s with several studies randomized controlled or observational methodology. The studies showed significant improvement in patient clinical outcomes than a physician. It showed better improvement of the anticoagulation therapeutic time range, much adherence to anticoagulation guidelines, more patient compliance, much patient satisfaction of the services, fewer complications of anticoagulation therapy, avoid the unnecessary economic burden on health care system, and the ability of the pharmacist to provide pharmacy based anticoagulation services [10-20]. In addition to another country including South Korea, Australia, Canada, Malaysia, Kenya, Thailand, *New Zealand*, Singapore, and United Kingdom [21-29]. Moreover, the two only of Middle East, countries like Qatar and recently Sudan started anticoagulation program [30-32]. They implemented the services and measured the program outcome with a plan of expanding the services. All the previous studies showed the implemented same services with individual and separated at their institutions. However, our program had the same content, policy, and procedures, but it is national wise implementation through MOH, coordinated, and combined through over several committees. Locally, the study conducted at East Province of Saudi Arabia about the pharmacist-managed anticoagulation clinic. The authors found better than traditional practice, reduction of adverse events of anticoagulation, and high patient satisfaction of the services [33].

### Pharmacy Anticoagulation Program in Kingdom of Saudi Arabia

In late 2012, the Minister of Health assigned the author as general manager of general administration of pharmaceutical care. The author updated the strategic planning of pharmaceutical care and started more thirty-pharmacy practice and clinical pharmacy programs, the Anticoagulation program among them [34-36]. The central committee of Anticoagulation formulated consisted of clinical pharmacists from different regions in Kingdom of Saudi Arabia. The central committee updated previous Anticoagulation formats based on the last issue of American College of Chest Physician (ACCP) thromboembolic disorder guidelines and Saudi Practice guidelines of Deep Vein Thrombosis (DVT) prophylactics for medical and surgical populations [37-38]. There is three type of anticoagulation committees; central pharmacy anticoagulation committee at MOH, the hospital pharmacy anticoagulation community and the team at the very hospital. Also, may organize regional pharmacy anticoagulation committee to supervise all hospital committee at each region with almost as the same as functions and works at their area as explored in Table 1. The central committee setup plan for five years, and policy and procedures of the anticoagulation hospital committee as explored in Table 1 and Table 2. Moreover, the committee finished of an anticoagulation key performance indicator for following program implementation. The example of the year 2012-2014 explored in Table 3. The program as national level is new and the author not familiar with any national program wise at Gulf or the Middle East countries

### Conclusion

Pharmacy anticoagulation program is part of clinical pharmacy services provided to the patient at MOH health care institution. The program is essential for hospital national and international accreditation. The program is highly demanding at Ministry of Health organization to reduce the patient morbidity and mortality in Saudi Arabia.

**Table 1:** Type of Pharmacy Anticoagulation committees

	Membership	Functions	Frequently meeting	Reporting
<b>1</b>	<b>Central Pharmacy Anticoagulation Committee</b>			
	National pharmacy anticoagulation program as head of the committee Anticoagulation Clinical pharmacist coordinator Anticoagulation clinical pharmacist from each twenty regions	Establish the National pharmacy anticoagulation program at MOH hospitals Setup strategic planning of National pharmacy anticoagulation program at MOH institutions Follow up and update of pharmacy anticoagulation program at MOH hospitals Implement and Follow-up National pharmacy anticoagulation committee at MOH hospitals Setup up policy and procedures of National pharmacy anticoagulation the program at MOH institutions Setup up National pharmacy anticoagulation program key performance indicators at MOH institutions Review all reports of National pharmacy anticoagulation program from all MOH institutions	Monthly	Every three months
<b>2</b>	<b>Hospital Pharmacy Anticoagulation Committee</b>			
	Consultant Cardiology or Hematology or Internal Medicine alternatively, chief of pharmacy as head of the committee The representative of the Commission on the Anticoagulation stewardship reporter Critical care physician Internal Medicine Physician Emergency physician Surgeon Pediatrician MD of obstetrics and gynecology Nurse Chief of clinical pharmacy department Clinical Pharmacist or Drug Information Center Total Quality Management Coordinator Risk management coordinator	Supervise the implementation of pharmacy anticoagulation program at the hospital Supervision of program activation, program follow-up, evaluation, and program development at the hospital. Approval of the pharmacy anticoagulation team members Review and update pharmacy anticoagulation protocol at least annually Review the job description, policy, and procedures of pharmacy anticoagulation team Supervising of pharmacy anticoagulation clinic Examine the pharmacy anticoagulation program needs of equipment and medical supplies,...etc	Monthly	Every three months
<b>3</b>	<b>Anticoagulation Stewardship team</b>			
	The team consists of • A hematology or cardiology or internal medicine clinical Pharmacist. • Anticoagulation Clinical Pharmacist • Anticoagulation Nurse.  The anticoagulation program begins with new patients admitted to hospital and any patient on anticoagulation before admission. Also, anticoagulation consultation from and medical or surgical team. The team may expand the future of the service wise to cover all patients.	Make round daily to all patients new hospital admission. Operate pharmacy anticoagulation clinics. Provide counseling of anticoagulation. Apply the anticoagulation protocol at hospital Follow up the patient on anticoagulation and resolve the drug related problem. Measure patient outcomes, quality of life, and cost avoidance Receive any anticoagulation program from any treating teams at the hospitals	Daily	Monthly

**Table 2:** Strategic plan of pharmacy anticoagulation program

Elements of the plan
<p>2014</p> <p>Stage 1</p> <ul style="list-style-type: none"> <li>Establish the central committee of pharmacy anticoagulation program</li> <li>Set the regional committee of anticoagulation program at twenty regions</li> <li>Set the anticoagulation committee at peripheral nine Hospitals</li> <li>Publish and distribute the adults anticoagulation manual booklet and electronic</li> <li>Deliver the anticoagulation training courses at MOH</li> <li>Implement the anticoagulation cost reduction projects</li> </ul> <p>2015</p> <p>Stage 2</p> <ul style="list-style-type: none"> <li>Review the central committee of pharmacy anticoagulation program</li> <li>Review the regional committee of anticoagulation program at twenty regions</li> <li>Establish the anticoagulation committee at peripheral ninety Hospitals</li> <li>Publish and distribute the pediatric anticoagulation manual booklet and electronic</li> <li>Establish adults and pediatric anticoagulation patient counseling program</li> <li>Review the adults anticoagulation manual booklet and electronic</li> <li>Review the adults anticoagulation utilization</li> <li>Review the adults anticoagulation consumption</li> <li>Implement adults anticoagulation key performance indicators at MOH hospitals</li> <li>Deliver the adults anticoagulation training courses at MOH</li> <li>Deliver the adults anticoagulation training sessions at twenty regions</li> </ul> <p>2016</p> <p>Stage 3</p> <ul style="list-style-type: none"> <li>Establish the anticoagulation committee at additional ninety Hospitals</li> <li>Review the anticoagulation committee at peripheral ninety Hospitals</li> <li>Review the pediatric anticoagulation manual booklet and electronic</li> <li>Review the adults anticoagulation manual booklet and electronic</li> <li>Review adults and pediatric anticoagulation patient counseling program</li> <li>Review the adults and pediatric anticoagulation utilization</li> <li>Review the adults and pediatric anticoagulation consumption</li> <li>Implement adults anticoagulation key performance indicators at MOH hospitals</li> <li>Implement pediatric anticoagulation key performance indicators at MOH hospitals</li> <li>Deliver the adults and pediatric anticoagulation training courses at MOH</li> <li>Deliver the adults and pediatric anticoagulation training sessions at twenty regions</li> </ul> <p>2017</p> <p>Stage 4</p> <ul style="list-style-type: none"> <li>Establish the anticoagulation committee at new ninety private Hospitals</li> <li>Review the anticoagulation committee at MOH Hospitals</li> <li>Update the pediatric anticoagulation manual booklet and electronic</li> <li>Update the adults anticoagulation manual booklet and electronic</li> <li>Update adults and pediatric anticoagulation patient counseling program</li> <li>Review the adults and pediatric anticoagulation utilization</li> <li>Review the adults and pediatric anticoagulation consumption</li> <li>Implement adults and pediatric anticoagulation key performance indicators at private hospitals</li> <li>Deliver the adults and pediatric anticoagulation training courses at MOH and private hospitals</li> <li>Deliver the adults and pediatric anticoagulation training sessions at twenty regions for MOH and private hospitals</li> </ul> <p>2018</p> <p>Stage 5</p> <ul style="list-style-type: none"> <li>Establish the anticoagulation committee at additional ninety private Hospitals</li> <li>Review the anticoagulation committee at MOH Hospitals</li> <li>Update the pediatric anticoagulation manual booklet and electronic for MOH and private sectors</li> <li>Update the adults anticoagulation manual booklet and electronic for MOH and private sectors</li> <li>Update adults and pediatric anticoagulation patient counseling program for MOH and private sectors</li> <li>Review the adults and pediatric anticoagulation utilization for MOH and private sectors</li> <li>Review the adults and pediatric anticoagulation consumption for MOH and private sectors</li> <li>Review adults and pediatric anticoagulation key performance indicators at MOH and private hospitals</li> <li>Deliver the adults and pediatric anticoagulation training courses at MOH and private hospitals</li> <li>Deliver the adults and pediatric anticoagulation training courses at twenty regions for MOH and private hospitals</li> </ul>

**Table 3:** Hospital anticoagulation program Key Performance Indicators

No	Key Performance Indicators	No	2013	2014
<b>Leadership and Management</b>				
1	Anticoagulation Committee (Central)	1	1	1
2	Anticoagulation Committee (Region)	20	0	15
3	Anticoagulation Committee (Peripheral)	250	0	20
4	Anticoagulation Manual-Booklet	1	0	1
5	Anticoagulation Manual Electronic	1	0	1
<b>Optimal Anticoagulation Management Use</b>				
1	Privilege of Anticoagulation Prescribing (Central)	50%	0	0
2	Privilege of Anticoagulation Prescribing (Region)	50%	0	0
3	Privilege of Anticoagulation Prescribing (Peripheral)	50%	0	0
4	Therapeutic Drug Monitoring (Central)	1	0	0
5	Therapeutic Drug Monitoring (Region)	20	0	0
6	Therapeutic Drug Monitoring (Peripheral)	250	0	0
7	Anticoagulation Automatic Stop order (Central)	50%	0	0
8	Anticoagulation Automatic Stop order (Region)	50%	0	0
9	Anticoagulation Automatic Stop order (Peripheral)	50%	0	0
<b>Monitoring Anticoagulation Medications and Use</b>				
1	Anticoagulation Consumption (Central)	1	0	0
2	Anticoagulation Consumption (Region)	20	0	0
3	Anticoagulation Consumption (Peripheral)	250	0	0
4	Anticoagulation Utilization Review(Central)	1	0	0
5	Anticoagulation Utilization Review(Region)	20	0	0
6	Anticoagulation Utilization Review(Peripheral)	250	0	0
7	Venous Thromboembolism Rate(Central)	Decrease or none	0	0
8	Venous Thromboembolism Rate(Region)	Decrease or none	0	0
9	Venous Thromboembolism Rate(Peripheral)	Decrease or none	0	0
10	Venous Thromboembolism Policy Adherence(Central)	50%	0	1
11	Venous Thromboembolism Policy Adherence(Region)	50%	0	0
12	Venous Thromboembolism Policy Adherence(Peripheral)	50%	0	0
13	Post Marketing Surveillance (Central)	0	0	1
14	Post Marketing Surveillance (Region)	0	0	0
15	Post Marketing Surveillance (Peripheral)	0	0	0
16	Drug Quality Reporting System (Central)	0	0	0
17	Drug Quality Reporting System (Region)	0	0	0
18	Drug Quality Reporting System (Peripheral)	0	0	0
19	Anticoagulation Medication Errors (Central)	0	0	1
20	Anticoagulation Medication Errors (Region)	0	0	0
21	Anticoagulation Medication Errors (Peripheral)	0	0	0
22	Anticoagulation Adverse Drug Reaction (Central)	0	0	0
23	Anticoagulation Adverse Drug Reaction (Region)	0	0	0
24	Anticoagulation Adverse Drug Reaction (Peripheral)	0	0	0

25	No of Mortality due to Venous Thromboembolism (Central)	0	0	0
26	No of Mortality due to Venous Thromboembolism (Region)	0	0	0
27	No of Mortality due to Venous Thromboembolism (Peripheral)	0	0	0
28	ISMP Self Assessment Anti-Thrombosis Medication Safety in Hospitals (Central)	Not less than 50%	NA	NA
29	ISMP Self Assessment Anti-Thrombosis Medication Safety in Hospitals (Region)	Not less than 50%	NA	NA
30	ISMP Self Assessment Anti-Thrombosis Medication Safety in Hospitals (Peripheral)	Not less than 50%	NA	NA
31	NO OF INR for individuals taking warfarin and interacting Hospital (Central)	0	NA	NA
32	NO OF INR for individuals taking warfarin and interacting Hospital (Region)	0	NA	NA
33	NO OF INR for individuals taking warfarin and interacting Hospital (Peripheral)	0	NA	NA
34	Lack of INR monitoring for individuals on warfarin; Hospital (Central)	0	NA	NA
35	Lack of INR monitoring for individuals on warfarin; Hospital (Region)	0	NA	NA
36	Lack of INR monitoring for individuals on warfarin; Hospital (Peripheral)	0	NA	NA
37	Percent time in therapeutic International Normalized Ratio (INR) range (TTR): Hospital (Central)	0	NA	NA
38	Percent time in therapeutic International Normalized Ratio (INR) range (TTR): Hospital (Region)	0	NA	NA
38	Percent time in therapeutic International Normalized Ratio (INR) range (TTR): Hospital (Peripheral)	0	NA	NA
Education and Research of Anticoagulation				
1	Anticoagulation Conference	1	0	0
2	Anticoagulation Course (Central)	2	0	1
3	Anticoagulation Course (Region)	2-4	0	0
4	Anticoagulation Course (Peripheral)	250	0	0
5	Anticoagulation Cost Reduction (Central)	Decrease 20-50%	0	1
6	Anticoagulation Cost Reduction (Region)	Decrease 20-50%	0	0
7	Anticoagulation Cost Reduction (Peripheral)	Decrease 20-50%	0	0

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