



Assessment of Pharmacists' Confidence When Consulting Patients on Anticoagulants: A Cross-Sectional Study in Iran

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ABSTRACT

Background: The pharmacists have a crucial role in providing pharmaceutical care to patients who receive anticoagulants. This study was conducted to evaluate the pharmacists' confidence in pharmaceutical consultation in the field of anticoagulant therapy, identify their educational needs, and find their commonly used sources of medical information. In addition, their preferred method for future educations and specific areas of interest were assessed.

Methods: This cross-sectional study was conducted between June 2018 and April 2019 among pharmacists involved in different areas of professional activity. They filled out an online questionnaire specifically developed to evaluate the aims of the study. The questionnaire was prepared in three parts including 6 questions about demographic information, 13 questions about confidence level, and 9 questions about the commonly used sources of medical information and educational needs of participants.

Results: At the end of the study, 229 pharmacists completed the questionnaire. The pharmacists' confidence was significantly higher when advising patients on warfarin versus non-vitamin K antagonists oral anticoagulants (NOACs) ($P=0.0001$). More than 98% of participants acknowledged that additional education is required in the field of anticoagulation. Among the different educational methods, electronic learning (e-learning) was more attractive than others ($P=0.0001$).

Conclusion: Pharmacists' confidence was lower in providing pharmaceutical support on NOACs compared with other anticoagulants. Our findings suggest that additional educational courses are needed to enable pharmacists on the provision of anticoagulation care, preferably via e-learning methods.

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Introduction

Warfarin has been the only oral anticoagulant available to treat thromboembolic disorders for several decades (1). Despite its well-established clinical utility, warfarin use has always been associated with significant morbidity and mortality, making it the second cause of drug-related emergency department visits (2). Therefore, significant efforts have been made to optimize warfarin treatment, one of which was pharmacist-led warfarin therapy; and a vast body of literature supports the role of pharmacists in this area (3).

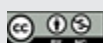
With the introduction of the first non-vitamin K antagonist oral anticoagulant (NOAC) in 2010, these agents replaced warfarin in many indications. Compared with warfarin, this

novel class of anticoagulants have rapid onset of action and fewer drug interactions (4). Unfortunately, there is currently no standardized laboratory test to monitor NOACs, such as the INR monitoring for warfarin. Therefore, the patient compliance and the effect of drug interactions cannot be assured. Since NOACs have short half-lives, missing the doses exposes the patients to serious complications of thrombotic events, as the results of an analysis on dabigatran showed that the risk of stroke increased by 13% when the patients' compliance decreased by 10%. Therefore, it seems that the traditional role of pharmacists in promoting INR monitoring for warfarin users should evolve to ensuring compliance and exploring drug interactions for NOAC users (5).

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In the health care system, pharmacists play an important role in detecting medical errors and increasing awareness of patients regarding drug interactions, monitoring requirements, and adverse effects (6). Hou et al., in their systematic review, showed that pharmacist-based anticoagulation management significantly decreased the risk of total hemorrhage and thrombosis events compared with physician- or nurse-based models. In addition, they found that patient education by pharmacists led to vigilant attention to bleeding symptoms and timely reporting (7). Another study supported the favorable role of clinical pharmacists in INR control and reduction in hospitalization rate due to warfarin complications (8).

A comprehensive multinational has been conducted on the pharmacists' confidence in provision of pharmaceutical care on anticoagulants (5), but there is no significant information about Iranian pharmacists. This study focused on the confidence of Iranian pharmacists when consulting patients in this area. In addition, the educational needs of pharmacists were also investigated. To the best of our knowledge, this is the first study conducted on Iranian pharmacists, which helps to discover current pitfalls in their practice in the field of anticoagulation management.

Methods

This cross-sectional study was carried out between June 2018 and April 2019 among pharmacists practicing in different clinical or industrial settings to evaluate their confidence and educational needs in the area of anticoagulants. The questionnaire was adopted from the survey conducted by Papastergiou et al., in 18 countries (5). The content validity of the Persian-language questionnaire was evaluated by 8 experts. The alpha Cronbach's method was used to evaluate the internal consistency and homogeneity of the questionnaire and the reliability calculated as 0.91. The external reliability was studied by test-retest method performed on 15 participants on two sessions 2 weeks apart.

The questionnaire contained 28 questions. The first part consisted of 6 questions about demographic information including age, sex, province, level of education, years of work experience, and field of practice. There were 13 items in second part, assessed the pharmacists' confidence level when counseling patients on warfarin, unfractionated heparin (UFH), enoxaparin, and NOACs. In this part, the pharmacists' confidence level was assessed regarding anticoagulant benefits, indications, adverse effects, management of adverse drug reactions, monitoring requirements, switching, interactions, and missed dose management. The answers were ranked on a 4-point scale as "very confident", "confident", "not so confident" and "not confident at all". The third part included 8 questions and investigated the most common sources used to obtain valid medical information and the interesting areas for future educations. In this part, the participants were allowed to choose more than one choice. All information related to the study participants was kept confidential.

The objectives of the study were described at the annual conference of the Iranian Society of Clinical Pharmacists. The questionnaire was then uploaded at the official website of the society (<https://www.clinicalpharmacy.ir>) and the information was collected.

All data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 19. The Shapiro-Wilk test was used to assess the normal distribution of data. Quantitative variables were presented as mean \pm standard deviation. Independent sample t-test and Mann-Whitney U-test were performed to compare normal and non-normal quantitative variables. Categorical variables were reported as frequencies and percentages. Chi-square and Kruskal-Wallis H test were used to compare categorical variables. In all comparisons, P-values less than 0.05 were considered as significant.

Results

A total of 229 participants filled the questionnaire. The demographic characteristics of the study participants are detailed in Table 1. As shown, the majority of participants had less than 30 years of age (131 participants, 57.2%) and about two third of them were females (153 participants, 66.8%). Figure 1 depicts the distribution of the study participants among the provinces of Iran. More than half of the respondents were from Tehran (75, 32.7%) and Fars (40, 17.5%) provinces.

Table 1. The socio-demographic characteristics of the study participants (N=229).

Variables	N	%	
Gender	Male	76	33.2
	Female	153	66.8
Age (years)	<30	131	57.2
	30-39	84	36.7
	40-50	11	4.8
	>50	3	1.3
Experience (years)	<5	148	64.6
	5-10	52	22.7
	11-15	16	7
	16-20	4	1.7
	>20	9	3.9
Level of education	Bachelor of Science	1	0.4
	Doctor of pharmacy	212	92.6
	Doctor of Philosophy	16	7
Area of practice	Community pharmacy	144	62.9
	Hospital pharmacy	73	31.8
	Academic pharmacy	8	3.5
	Pharmaceutical industry	4	1.8

Figure 2 presents the level of participants' confidence

when providing patient care for various anticoagulants. The percentages of participants who felt “very confident” or “confident” were 77.2% (n=177) for warfarin, 55.5% (n=127) for UFH, 71.2% (n=163) for enoxaparin, and 34.0% (n=78) for NOAC. A Kruskal-Wallis test showed that there was a statistically significant difference in

confidence level between the different anticoagulants, $\chi^2(2) = 103.3, p < 0.000$, with a mean rank score of 539.0 for warfarin, 511.0 for LMWH, 441.0 for UFH, and 343.0 for NOACs. The pairwise comparisons were conducted which showed significant differences between NOACs and other anticoagulants ($p < 0.001$).

Figure 1. Distribution of participants by province of origin.



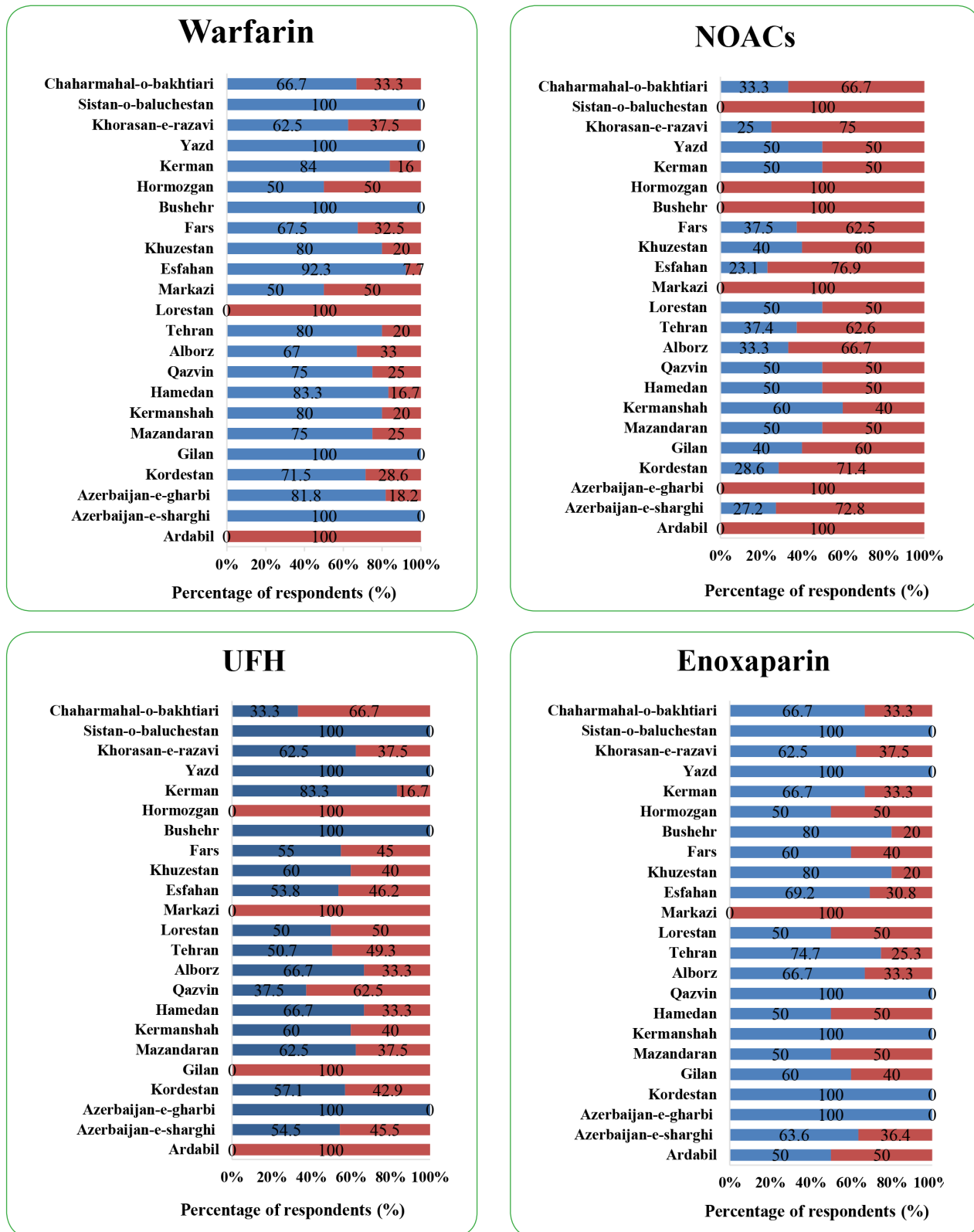
Province	Participants%	Province	Participants%	Province	Participants%
Ardabil	0.88	Qazvin	3.49	Fars	17.47
East Azerbaijan	4.80	Qom	0.44	Bushehr	2.18
West Azerbaijan	2.18	Alborz	1.32	Hormozgan	0.88
Kordestan	3.05	Tehran	32.75	Kerman	2.60
Gilan	2.18	Ilam	0.44	Yazd	0.88
Mazandaran	3.49	Lorestan	0.88	Razavi Khorasan	3.49
Golestan	0.44	Markazi	0.88	South Khorasan	0.44
Kermanshah	2.18	Esfahan	5.24	Sistan and baluchestan	0.88
Hamedan	2.62	Khuzestan	2.18	Chaharmahal and bakhtiari	1.74

Seventy-five percent of hospital pharmacists and 76.5% of non-hospital pharmacists felt “confident” or “very confident” regarding warfarin consultation ($p=0.84$). The corresponding values for NOACs were 42.5% and 32.1%, respectively ($p=0.21$).

The level of confidence did not differ based on the age category of participants when advising on warfarin ($p=0.09$) or NOACs ($p=0.11$) (results not shown). The confidence

levels of pharmacists in various aspects of anticoagulation are presented in Figure 3. The participants were “very confident” or “confident” when consulting about the benefits ($n=179, 78.1%$) and indications ($n=167, 72.9%$) of anticoagulants. On the other hand, the lack of confidence was observed in the areas of anticoagulant switching ($n=38, 16.6%$), control of adverse drug reactions ($n=59, 25.8%$), and miss dose management ($n=63, 27.5%$).

Figure 2. The confidence levels of pharmacists by province of origin.



As the common sources of information, most pharmacists used medical software such as Medscape, UpToDate, Micromedex, etc. (n= 189, 79.0%), followed by reference books (n=123, 53.7%), package inserts (n=98, 42.8%), and internet (n=83, 36.2%). Less than 22% (n=50) of respondents used published journal articles to achieve required information.

Only 27 respondents (11.8%) had participated in educational courses on anticoagulants before the study. Nearly all of the participants (225, 98.3%) declared that they need additional education regarding clinical uses of anticoagulants; the main areas were management of bleeding, drug interactions, adverse reactions, and switching. The majority of respondents (218, 95.2%) stated that providing a list of frequently asked questions would be beneficial for them to

provide better consultation on anticoagulants. Moreover, the results showed that mobile applications (n=155, 67.6%) and medical software (n=127, 55.5%) were the most favored tools found to be useful as a quick reference of anticoagulation.

The majority of participants (n=225, 98.2%) were interested to receive additional education to improve their confidence level. The preferred areas for further education were management of bleeding (n=183, 79.9%), drug interactions (n=177, 77.3%), adverse drug reactions (n=176, 76.8%), and switching (n=168, 73.4%). These participants favored e-learning as the preferred method for future education (n=136, 59.4%), followed by workshop (n=112, 48.9%), symposia (n=82, 35.8%), and educational software (n=67, 29.2%).

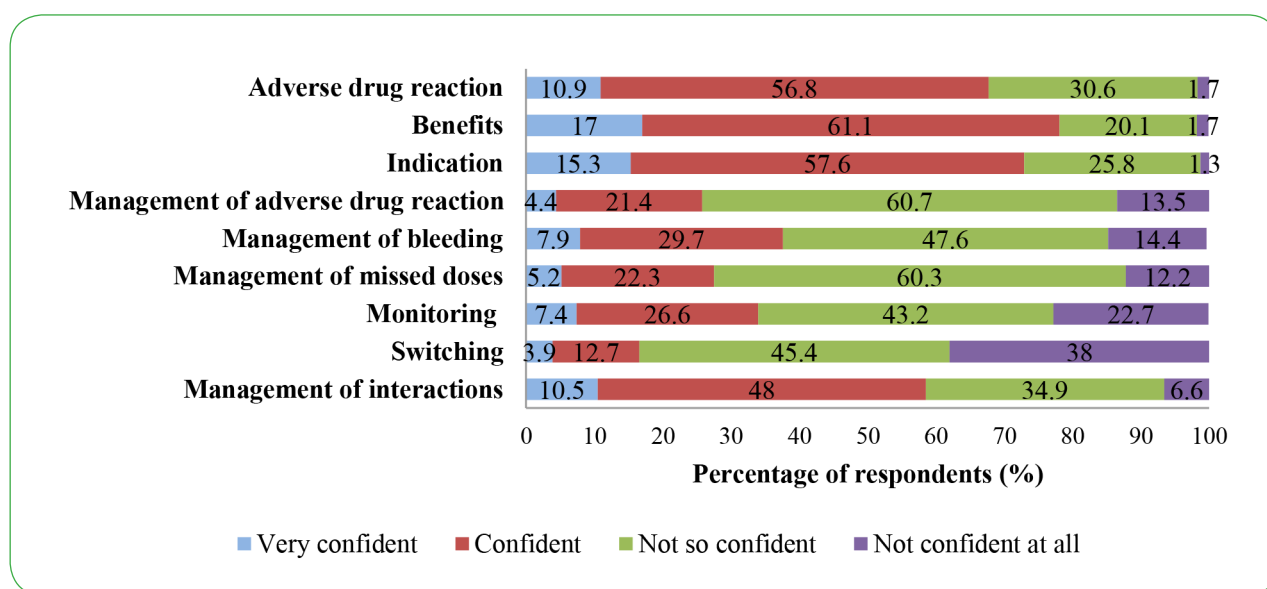


Figure 3. The confidence levels of pharmacists in various aspects of anticoagulation.

Discussion

Pharmacists, as a member of the health care team, play a crucial role in controlling medication errors and improve medication safety (6). There is extensive evidence that demonstrates the benefits of anticoagulant therapy managed by the pharmacists (8-11). In the current study, the highest level of confidence was reported for warfarin, followed by enoxaparin, UFH, and NOACs. A possible explanation for this might be that warfarin has been in the market since the 1950s (12), while the first NOAC, dabigatran, was introduced in 2010 (13). Therefore, greater experience with warfarin may have led to the higher level of confidence for pharmacists. On the other hand, the least level of confidence was declared for NOACs; which may simply reflect their recent introduction into the market. In line with these findings, Papastergiou et al., assessed the confidence and knowledge gaps among pharmacists from different countries. They illustrated that the level of confidence in the area of warfarin therapy was more than NOACs (5). It

should be emphasized, however, that the majority of our participants were under the age of 30 and had been educated on NOACs during their academic education. Therefore, if older pharmacists were included, the difference between warfarin and NOACs would be even more highlighted.

In this study, there was no difference in the confidence level of hospital and non-hospital pharmacists. This result differs from those reported by Papastergiou et al., (5), who found that hospital pharmacists were more confident in providing anticoagulant consultation. This difference can be explained in part by the fact that Iranian hospital pharmacists are mainly involved in drug dispensing rather than clinical consultation.

The pharmacists' confidence was greater in areas of identifying benefits, indications, and adverse effects of anticoagulants. However, the participants reported lower level of confidence in switching, management of adverse drug reactions, and missed dose management. Therefore, as

the clinical scenario becomes more complex, pharmacists' confidence in their recommendations decreases. This may have led to the finding that more than 98% of participants tended to seek information on various aspects of anticoagulation.

The virtual methods such as e-learning and webinars were the most favorable ones among participants to fill their knowledge gaps. These results are consistent with those of Papastergiou et al., which reported e-learning as the preferred method of learning (5). Several studies have been conducted to compare the virtual education and traditional methods. These studies revealed that various types of virtual education had similar or greater efficacy compared with traditional training methods and there was higher satisfaction of audiences and teachers with using these methods (14, 15). Virtual approach gives the opportunity to learn without time or place limitations. It should be noted again that our participants, mainly, consisted of young pharmacists which are more familiar with newer technology-based learning methods. Of note, the preferred method of learning could change dramatically if older ones were questioned.

The most important limitation of the current study lies in the fact that a considerable portion of participants was from two provinces of Tehran and Fars. Moreover, most of them were under the age of 40.

Three interesting findings could be drawn from present study: first, the pharmacists' confidence was significantly higher when providing pharmaceutical care for warfarin compared with NOACs. Second, the majority of participants needed additional education to provide advanced anticoagulation care; and third, among learning methods, virtual ones were the most popular. Therefore, additional education on anticoagulant management is recommended to improve confidence and practice of our pharmacist, mainly based on e-learning methods.

References

1. Ageno W, Gallus AS, Wittkowsky A, Crowther M, Hylek EM, Palareti G. oral anticoagulant therapy: antithrombotic therapy and prevention of thrombosis, 9th ed: american college of chest physicians evidence-based clinical practice guidelines. *Chest* 2012; 141(2 Suppl):e44S-e88S.
2. Epstein RS, Moyer TP, Aubert RE, et al. Warfarin genotyping reduces hospitalization rates results from the MM-WES (Medco-Mayo Warfarin Effectiveness study). *J Am Coll Cardiol* 2010; 55(25):2804-12.
3. Lee T, Davis E, Kielly J. Clinical impact of a pharmacist-led inpatient anticoagulation service: a review of the literature. *Integr Pharm Res Pract* 2016; 5:53-63.
4. Harter K, Levine M, Henderson SO. Anticoagulation drug therapy: a review. *West J Emerg Med* 2015; 16(1):11-7.
5. Papastergiou J, Kheir N, Ladova K, et al. Pharmacists' confidence when providing pharmaceutical care on anticoagulants, a multinational survey. *Int J Clin Pharm* 2017; 39(6):1282-90.
6. Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: current insights. *Integr Pharm Res Pract* 2017; 6:37-46.
7. Hou K, Yang H, Ye Z, Wang Y, Liu L, Cui X. effectiveness of pharmacist-led anticoagulation management on clinical outcomes: A Systematic Review and Meta-Analysis. *J Pharm Pharm Sci* 2017; 20(1):378-96.
8. Ahmed NO, Osman B, Abdelhai YM, El-Hadiyah TMH. Impact of clinical pharmacist intervention in anticoagulation clinic in Sudan. *Int J Clin Pharm* 2017; 39(4):769-73.
9. Bishop L, Young S, Twells L, Dillon C, Hawboldt J. Patients' and physicians' satisfaction with a pharmacist managed anticoagulation program in a family medicine clinic. *BMC Res Notes* 2015; 8(1):233.
10. Schmode A, Ackman M, Bungard TJ. Antiplatelet, anticoagulant or both? A tool for pharmacists. *Can Pharm J (Ott)* 2019; 152(5):291-300.
11. Manzoor BS, Cheng WH, Lee JC, Uppuluri EM, Nutescu EA. Quality of pharmacist-managed anticoagulation therapy in long-term ambulatory settings: A Systematic Review. *Ann Pharmacother* 2017; 51(12):1122-37.
12. Lee MTM, Klein TE. Pharmacogenetics of warfarin: challenges and opportunities. *J Hum Genet* 2013; 58(6):334-8.
13. Ashrafi F, Rezaie N, Mousavi S. New indications for dabigatran: a suggestion from a drug use evaluation study. *J Res Pharm Pract* 2017; 6(4):211-6.
14. Surjono H, Muhtadi A, Wahyuningsih D. The implementation of blended learning in multimedia courses for undergraduate students in Indonesia. *Int J Inf Educ Technol* 2017; 7:783-6.
15. Noori A KL, Akbari F, Assarian M, Rakhshan A, Eslami K. A review on different virtual learning methods in pharmacy education. *J Pharm Care* 2015; 2(2):77-82.