Assessment of health literacy in patients receiving warfarin anticoagulation therapy and correlation of results with anticoagulant control

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Background:

Warfarin is the most widely used anticoagulant in the world and remains the drug of choice for the treatment and prevention of thromboembolic disorders. Along with appropriate monitoring of a patients international normalized ratio level, education of the patient forms the cornerstone of optimal anticoagulation control. [1] Many factors are known to affect anticoagulant control e.g. dietary intake of vitamin K.[2]

A study by Kagansky *et al.* (2004) established that poor quality of patient education regarding warfarin was the most significant risk factor for bleeding complications and for the ineffectiveness of anticoagulation.[3] By identifying a patients level of health literacy (defined as; "*the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions*")[4] one can help to ensure that any health information is tailored to the correct level and by doing so empower the patient to take responsibility for their own health and consequently improve medication adherence and healthcare outcomes.

Aims/Objectives:

- To assess the health literacy (HL) of patients attending a warfarin anticoagulation clinic.
- To obtain data on the time in therapeutic range (TTR) of each patient.
- To analyse the results of the above and establish whether there is a link between adequate HL and TTR.

Study design:

Following local ethical approval and approval from the Cork Research Ethics Committee (CREC), patients attending the Pathologist-supervised and Pharmacist-led oral anticoagulation clinic were asked to participate and included in the study if they met the following criteria; aged over 18 years, not visually impaired, no hearing impairment, English as a first language. They were excluded if they had been taking warfarin for less than three months.

Data collection took place from May to July 2011. Patients who consented were asked a series of questions relating to demographics, ethnicity, employment status and level of education achieved. They were then administered the REALM screening tool.[5] The REALM consists of 66 medical terms and the patient is asked to read these terms out loud. A score of 61 or greater indicates adequate HL whereby a score of 60 or less indicates limited HL. The patients were then asked a series of questions likely to predict HL[6] e.g. Are medical forms difficult to fill out? Data relating to indication for warfarin, target international normalized ratio (INR) and total TTR were obtained from the Rapid Anticoagulation Interpretation and Dosing (RAID) computer system and recorded.

The percentage TTR was calculated by RAID which uses the Rosendaal method.[7]

The Predictive Analytics Software (PASW) Statistics 18 system was used for analyzing data. The level of statistical probability was set at $p<0.05$. Means ± Standard deviation (SD) are reported where appropriate. For determining bi-variate correlations, nonparametric Spearman's rank order (Spearman's rho) was used.

Results:

During the study period, 578 patients were registered in the clinic; of those 182 were approached, 172 accepted and then 129 completed the study (94.5% uptake). The majority of patients who completed the study were male (63.6%), white Irish (99.2%) and not in paid employment (83.7%). The mean age was 72 years (SD 9.5) and the mean age at which patients left full-time education was 18 years (SD 3.6). The most common indication for warfarin was atrial fibrillation (74.4%). The mean TTR was 70.8% (SD 15.3) and ranged from 27% to 98%.

Adequate HL was prevalent among the patients who completed the study (82.2%). A mean REALM score of 63.1 (SD 3.7) was ascertained with a minimum score of 47 and maximum score of 66.

Nearly half of all patients (46.5%) read a book either daily or at least once a week compared to 30.2% who never read books.

There was a statistically significant correlation between level of education and TTR as well as REALM scores. A further significant correlation was found between the frequency with which patients read a book and their REALM scores (Table 1).

There was an association between REALM score and TTR although this did not reach statistical significance.

Table 1: Bi-variate correlations using nonparametric Spearman's rho (*indicates statistically significant result)

		TTR	REALM
REALM	*Correlation*	0.09	
	Sig. (2-tailed)	0.313	
Level of education	*Correlation*	0.173	0.452
	Sig. (2-tailed)	0.05*	0.000*
How often does the patient read a book	*Correlation*	0.112	0.231
	Sig. (2-tailed)	0.205	0.009*

Discussion:

In this study there was a statistically significant positive correlation with TTR and level of education ($p=0.05$) and with REALM and level of education ($p<0.05$). Similarly other studies have also shown that limited HL is associated with fewer schooling years.[6,8]

In contrast de Barros Costa *et al.* compared elderly warfarin patients with fewer years of formal education to non-elderly warfarin patients with higher educational levels and found similar mean TTRs.[9]

There was a statistically significant positive correlation found between how often the patient reads a book (a predictor of HL) and REALM score ($p=0.009$). This compares to Ibrahim *et al.* where higher rates of poor HL were observed for those who never or only sometimes read a book.[6]

Overview:

•This study found that the REALM strongly correlated with other likely predictors of HL namely 'how often the patient reads a book' and the level of full time education reached by the patient

•This study identified a significant positive correlation between a predictor of HL (level of education) and TTR

•Pharmacists have a key role to play in tailoring education to patients' needs. This in combination with frequent monitoring should improve outcomes in those with limited HL

[1-9]**References**: 1. Seliverstov I. Practical management approaches to anticoagulation non-compliance, health literacy and limited English proficiency in the outpatient setting. Journal of Thrombosis and Thrombolysis 2011; 31:321-5. 2. Ryan F, Byrne S, O'Shea S. Managing oral anticoagulation therapy: improving clinical outcomes. A review. Journal of Clinical Pharmacy and Therapeutics 2008;33:581-590. 3. Kagansky N, Knobler H, Rimon E, Ozer Z, Levy S. Safety of anticoagulation therapy in well-informed older patients. Archives of Internal Medicine 2004;164:2044-2050. 4. Institue of Medicine. Health Literacy: A Prescription to End Confusion. April 8, 2004. 5. Davis TC, Long SW, Jackson RH et al. Rapid estimate of adult literacy in medicine: a shortened screening instrument. Fam Med 1993;25:391-95. 6. Ibrahim SY, Reid F, Shaw A, Rowlands G, Gomez GB, Chesnokov M, Ussher M. Validation of a health literacy screening tool (REALM) in a UK population with coronary heart disease. Journal of Public Health 2008;30:449-455. 7. Hirumed RAID CDSS programme available from www.hirumed.co.uk (accessed 1st June 2011). 8. Osborn CY, Paasche-Orlow MK, Bailey SC, Wolf MS. The mechanism linking health literacy to behaviour and health status. American Journal of Health Behaviour 2011;35:118-128. 9. De Barros Costa GL, Ferreira DC, Valacio RA, Moreira MCV. Quality of management of oral anticoagulation as assessed by time in therapeutic INR range in elderly and younger patients with low mean years of formal education: a prospective cohort study. Oxford Journals Medicine Age and Ageing 2010;40:375-381.

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