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Factors Favoring the search on PubMed among Latin American medical students

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ABSTRACT

Aim: To determine the factors associated with the frequent use of PubMed in medical students from 40 Latin American medical schools.
Methods: We developed a cross-sectional analytical study from medical students from Latin America. The dependent variable was the frequent use of PubMed, defined as the use report at least once a week and daily. Simple and multiple regression models were constructed, estimating prevalence ratios (RP) using multilevel generalized linear models.
Results: Of 11587 students, 59.3% reported using PubMed frequently. Students who belonged to clinical cycles (RP = 1.19), who were affiliated with a SOCEM (RP = 1.13), who reported mastery of basic (RP = 1.25), intermediate (RP = 1.47) and advanced (RP = 1.46), Bibliographic search training (RP = 1.22) and database training (RP = 1.42) had a higher frequency of use of this database.
Conclusions: The report of frequent use of PubMed in undergraduate is high. Modifiable factors positively associated with frequent use of PubMed were the training report in bibliographic search, the report in use of the database, the report of English proficiency, and belonging to a SOCEM.
Keywords: research; medical students; medical education; Latin America(Source: MeSH)

INTRODUCTION

The high production of scientific evidence has led to Evidence-Based Medicine (EBM) to emerge as an important skill to develop among medical students[1,2]. Students have to critically interpret the validity and importance of published studies so that they can apply it appropriately *PubMed* is one of the most accessible biomedical resources worldwide[3] and a base used by medical students in Latin America[4].

The main organizations such as the Institute of Medicine in the United States and the World Federation for Medical Education are promoting the implementation of these SEM courses at the undergraduate level in Peru[5,6]. There is still a low level of knowledge in database management and bibliographic searches since approximately two-thirds of students do not know or have never used a database[7], despite the great access to the Internet[8] among medical students. Previous studies have shown that frequent use of PubMed by students and health care professionals is low[9,10].

Studies have been conducted on the use of information sources by medical students in some Latin American countries, but the factors that may be influencing the use of PubMed are not known at the Latin American level[4]. Therefore, the objective of this research was to determine the factors associated with the frequent use of PubMed in medical students.

METHODS

Study design: Analytical transversal study of secondary analysis of data from Latin American medical students, whose purpose was to determine the factors associated with frequent use of PubMed.
Population and Sample: Out of 40 faculties in Latin America from 11 countries, 1,587 medical students were enrolled in 2016.

Stratified random sampling by year of study was implemented. A sample of 318 students was determined for each participating university, using a statistical power of 80%, statistical significance at 95%, and 10% for potential losses.
Study Procedures: A collaborative team was formed at the 40 participating medical schools. Authorization was sought from the medical school of each university to survey medical students in each academic year. Additionally, questionnaires were distributed in the classrooms considering the total estimated sample for each year of study. The questionnaire was self-administered in approximately 15 minutes. Then, a pre-digitation quality control process was performed for subsequent data entry into a standardized template for all sites in the Microsoft Excel 2016 program.
Instrument and variables: The questionnaire questions measured socio-educational variables, information and communication technologies, scientific databases, social networks, training in scientific tools, curricular, and extracurricular experience in research.

The dependent variable was the frequent use of PubMed, defined as the student's self-report to the question What is the frequency of use of PubMed, whose response categories never used it, at least once this year, at least once a month, at least once a week and every day. It was dichotomized into frequent use (at least once a week

and daily) and non-frequent use (never used, at least once this year, at least once a month).

The independent variables were age in years, gender, type of university, clinical courses, Scientific Society of Medical Students affiliation (SOCEM, by its Spanish acronym), English language proficiency, report of training in bibliographic search, and databases.

Statistical Analysis: The statistical program Stata v.15.0 was used. (StataCorp LP, College Station, TX, USA). Frequencies and percentages in the categorical variables were reported. For age, the normal distribution was evaluated, and the median and minimum-maximum values were estimated.

In the bivariate analysis, the chi-square test of independence was used to investigate the association between the categorical socio-educational variables and the frequent use of PubMed, after evaluating the assumption of expected frequencies. In the case of age, the non-parametric Mann Whitney U test was used.

Single and multiple regression models were constructed, estimating prevalence ratios (PR) using multilevel generalized linear models with Poisson distribution family, log-link function, robust variance, and university as a cluster. In the multiple regression, the log-likelihood ratio test (LRTest) was used to build nesting levels to check the inclusion of the variables in the final parsimonious model.

Ethical considerations: The primary study was approved by the Ethics Committee of the San Bartolomé National Hospital, Lima, and endorsed by the National Health Institute (INS, by its Spanish acronym). The confidentiality of the participants was preserved since the questionnaire was anonymous and codes were used in the database of all the sites.

RESULTS

Of 11587 medical students, the majority were female (53.7%) and the average age was 21 years. The average age was 21 years. 42.8% were Peruvian. More than half of the students reported having been trained in bibliographic search (60.2%) and scientific database (53.7%). 59.3% reported using PubMed frequently (Table 1).

Frequent use of PubMed in medical students was higher in those in clinical cycles compared to those still in basic career courses (66% vs. 48.3%, p<0.001). There was a higher frequency of PubMed use in students who reported database training than in those who did not report such training (43.5% vs. 72.9%, p<0.001). Additionally, there was also an association between training in bibliographic searches and scientific databases (Table 2).

The regression showed that students affiliated with a SOCEM were 13% more likely to report frequent use of PubMed (RP=1.13). Students whose English proficiency was reported as basic, intermediate and advanced had 25% (RP=1.25), 47% (RP=1.47) and 46% (RP=1.46) higher frequency of PubMed use, respectively. The frequency of reporting frequent use of PubMed is 22% (PR=1.22) and 42% (PR=1.42) higher in students who reported training in bibliographic and database searching, respectively (Table 3).

Table 1: Characteristics of medical students from 11 Latin America

Characteristics	N (%)
Gender	
Male	5363 (46.3)
Female	6224 (53.7)
Age (years)*†	21 (15-44)
Country	.
Peru	4962 (42.8)
Paraguay	1073 (9.3)
Bolivia	960 (8.3)
Colombia	849 (7.3)
Venezuela	643 (5.6)
Ecuador	638 (5.5)
Mexico	636 (5.5)
Argentina	636 (5.5)
Panama	634 (5.5)
Honduras	318 (2.7)
Chile	238 (2.1)
Type of university	.
Public	6119 (52.8)
Private	5468 (47.2)
Clinical semesters †	
No	4946 (47.1)
Yes	5551 (52.9)
SOCEM	
No	10138 (87.5)
Yes	1449 (12.5)
English skills†	
Doesn't speak	2028 (17.6)
Basic	4666 (40.6)
Intermediate	3187 (27.7)
Advanced	1618 (14.1)
Bibliographic search training†	
No	4564 (39.8)
Yes	6894 (60.2)
Database training †	
No	5300 (46.3)
Yes	6148 (53.7)
Frequent use of PubMed†	
No	4539 (40.7)
Yes	6591 (59.3)

* Median (minimum-maximum value)
† Some values do not add up to 11587 due to missing data

Table 2: Factors associated with frequent use of PubMed in bivariate analysis

Variables	Frequent use of PubMed		*p***
	No (n=4539)	Yes (n=6591)	
	n(%)	n(%)	
Gender			
Male	2149 (41.6)	3020 (58.4)	0.09
Female	2380 (40.0)	3571 (60.0)	
Aged (years)†*††	20 (15-43)	21 (16-44)	<0.001
Type of university			
Public	2280 (39.1)	3554 (60.9)	<0.001
Private	2249 (42.6)	3037 (57.5)	
Clinical semesters†			
No	2481 (51.7)	2314 (48.3)	<0.001
Yes	1788 (34.0)	3475 (66.0)	
SOCEM			
No	4162 (42.8)	5557 (57.2)	<0.001
Yes	367 (26.2)	1034 (73.8)	
English skills†			
Doesn't speak	1103 (55.7)	877 (44.3)	
Basic	2024 (45.2)	2452 (54.8)	<0.001
Intermediate	917 (30.0)	2141 (70.0)	
Advanced	447 (29.1)	1090 (70.9)	
Bibliographic search training†			
No	2471 (55.8)	1954 (44.2)	<0.001
Yes	2032 (30.6)	4609 (69.4)	
Database training †			
No	2890 (56.5)	2226 (43.5)	<0.001
Yes	1610 (27.1)	4335 (72.9)	

* Median (minimum-maximum value)
† Some values do not add up to 11587 due to missing data
**p-values calculated with the Chi Square test of independence
††p-values calculated with Mann Whitney's U-test

Table 3: Factors independently associated with frequent use of PubMed in multiple regression analysis

Variables	Simple regression			Multiple Regression, Parsimonic Model A*		
	PR	IC 95%	*p*	PR	IC 95%	*p*
Gender						
Male	**Ref.**					
Female	1.03	1.00-1.06	0.091			
Aged (years)	1.05	1.04-1.05	<0.001	1.02	1.02-1.03	<0.001
Type of university						
Public	Ref.					
Private	0.94	0.91-0.97	<0.001			
Clinical semesters						
No	Ref.			Ref.		
Yes	1.37	1.32-1.42	<0.001	1.19	1.14-1.23	<0.001
SOCEM						
No	Ref.			Ref.		
Yes	1.29	1.25-1.34	<0.001	1.13	1.08-1.17	<0.001
English skills						
Doesn't speak	Ref.			Ref.		
Basic	1.24	1.17-1.31	<0.001	1.25	1.18-1.32	<0.001
Intermediate	1.58	1.50-1.67	<0.001	1.47	1.39-1.56	<0.001
Advanced	1.6	1.51-1.70	<0.001	1.46	1.37-1.55	<0.001
Bibliographic search training						
No	Ref.			Ref.		
Yes	1.57	1.51-1.63	<0.001	1.22	1.16-1.28	<0.001
Database training						
No	Ref.			Ref.		
Yes	1.68	1.62-1.74	<0.001	1.42	1.35-1.48	<0.001

* p values obtained with Generalized Linear Multilevel Mixed Effects Models (MEGLM), *Poisson* family, log link function, robust variance
PR: prevalence ratios

DISCUSSION

The percentage of PubMed use we found (59.3%) was lower than the frequency of use among physicians in Peru, who stated that they used it 71% of the time (at least once a year)(9) ; but this is more frequent than what was found in the use by medical students in Peru, who reported 22% of frequent use[7] .

These differences may be due to the fact that the Canelo(9) study considered in its definition the frequency of use to enter the base at least once a month in resistant physicians and assistants; and Mejia(7) had the same definition in medical students. Thanks to information and communication technologies, access to information is high (11), so the problem would lie mainly in whether people are trained in the use of PubMed and another database.

The report of previous training in bibliographic searches and database management were factors associated with the frequent use of PubMed. This is similar to that reported by Ghadi et al[12], who showed that training in EBM positively influenced the use of Cochrane and the search for original articles. Planned and educationally sound EBM interventions can have a positive impact on the development of research skills at the undergraduate level[13,14]. Therefore, our findings reinforce the importance of implementing these courses in medical education.

Students affiliated with a SOCEM were more likely to use PubMed frequently. In the Latin American context, SOCEMs are an active means of training in undergraduate research skills[7,15,16]. Therefore, in the Latin American context, the SOCEMs are a platform that responds to research needs[17,18].

Continuous training and the importance of knowing that modifiable knowledge factors such as training in bibliographic searches, the use of databases, command of English and belonging to a SOCEM are favorably associated with the use of PubMed, should provide a call for higher medical education policies (such as constant training in all years of study on bibliographic searches, providing access to the main repositories found in PubMed, etc.).

This research has some limitations. First, variables were measured by self-reporting, therefore, there is potential measurement bias, so the estimators may vary. Second, our results cannot be extrapolated to all medical students in Latin America and the Caribbean; this is because students were recruited from medical schools where a local SOCEM operated.

However, this research provides knowledge that will help to understand the potential socio-educational influences on a medical student's frequent use of PubMed, which is the most important scientific database in the medical sciences.

CONCLUSION

We conclude that the frequent use of PubMed in Latino medical students is high. In addition, age, belonging to clinical cycles, being affiliated with a SOCEM, having basic, intermediate, and advanced English proficiency, and being trained in bibliographic and database searching are positively associated with the frequent use of PubMed.

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Conflicts of Interest: The authors declare no conflict of interest.

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