Practice theses in Cardiology: Research themes, Study plans and Editorial quality

Les thèses d'exercice en Cardiologie : thématiques de recherche, schémas d'étude et qualité rédactionnelle

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Summary

Introduction: The gap between numerous dissertations and scarce scientific publications is a key challenge in medical research. This study analyzed the research topics, study designs, and editorial quality of Cardiology theses at the Faculty of Medicine of Sousse (FMSo).

Methods: We conducted a bibliometric descriptive study of Cardiology practice theses defended at FMSo (2000–2019). Data were collected from cover pages, back pages, and/or conclusions. Research topics were identified using indexed keywords, grouped into major descriptors and themes. Study designs were classified per the Evidence-Based Medicine pyramid. Editorial quality was assessed using a 20-item grid, with a satisfactory score defined as ≥75/100.

Results: Among 111 theses, 52% focused on ischaemic heart disease (28%), rhythm disorders (14%), and valvular heart disease (10%), while interventional cardiology was covered in 32%. Most studies were clinical (97%), with a descriptive approach (55%) and prospective designs in 19%. Editorial quality was satisfactory in 59%, with a significant improvement over time (31.3% to 79.4%, $p < 10^{-3}$).

Conclusion: Despite improved editorial quality, Cardiology theses often show low evidence levels. Strengthening bibliometric monitoring and editorial skills of students and supervisors is crucial to enhance their transition into scientific publications.

Keywords

Bibliometrics; Academic dissertation;Schools, Medicine ; Medical Writing ; Tunisia

Résumé

Introduction : L'analyse des thèses en médecine évalue l'écart entre leur abondance et la rareté des publications. Cette étude vise à décrire les thématiques, schémas d'étude et qualité rédactionnelle des thèses en Cardiologie soutenues à la Faculté de Médecine de Sousse (FMSo).

Méthodes: Il s'agit d'une étude bibliométrique descriptive des thèses de Cardiologie soutenues entre 2000-2019. Les données ont été extraites des pages de garde, verso et/ou conclusions. Les thématiques ont été définies via les mots-clés indexés, regroupés en descripteurs majeurs et catégories thématiques. Les types d'étude ont été classés selon la pyramide de l'Evidence-Based Medicine. La qualité rédactionnelle a été évaluée sur 20 items, jugée satisfaisante si ≥75/100.

Résultats: Parmi 111 thèses, 52% portaient sur les cardiopathies ischémiques (28%), troubles du rythme (14%) et cardiopathies valvulaires (10%). Un tiers concernait la cardiologie interventionnelle. Les études étaient cliniques (97%), majoritairement descriptives (55%), avec une approche prospective dans 19%. La qualité rédactionnelle était satisfaisante dans 59% des cas, avec une nette amélioration entre les deux décennies (31,3% à 79,4%, $p<10^{-3}$).

Conclusion: Malgré une amélioration de la qualité rédactionnelle, le niveau de preuve reste faible. Une réforme axée sur la veille bibliométrique et le renforcement des compétences éditoriales des thésards et encadrants est essentielle pour faciliter leur conversion en articles scientifiques.

Mots-clés

Bibliométrie; Dissertation universitaire ; Ecoles de médecine ; Rédaction médicale ; Tunisie

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INTRODUCTION

Scientific production in medical research is currently recognized as an indicator of healthcare system performance The practice thesis in Medicine, a fundamental component of medical studies, remains the main channel for scientific production, eligible to generate publications that enhance the quality of health science faculties and the international reputation of their universities. Writing a practice thesis, an almost universal ritual for obtaining the diploma of 'Doctorate in Medicine', represents a huge investment of time and effort for both students and their scientific directors [1]. However, a considerable proportion of practice theses continue to be found in 'grey literature', with no scientific publication, thus perpetuating a paradox of "Plethora of Practice Theses" versus a "Shortage of Scientific Papers" [2]. This phenomenon has already been documented by numerous bibliometric studies of dissertations conducted in medicine (all disciplines combined), particularly in universities not yet selected by the international rankings of universities [3]. Thus, the doctoral thesis in Medicine, beyond its certifying function, is the gauge of faculty performance, which is no longer measured by the number of dissertations supported, but rather by the number of scientific publications indexed and their citations in international literature [4,5].

In Tunisia, over the last two decades, many Cardiology practice theses were supported within the Faculty of Medicine of Sousse (FMSo). These dissertations explored research themes, reflecting the epidemiological transition of population health needs, and reflecting the integration of new diagnostic and therapeutic technologies in the clinical setting. They continue to face up to the need to reconcile the multifaceted training in 'Family Medicine' with the high-tech specialization in Cardiology [6,7]. Thus, the bibliometrics of practice theses in Cardiology is essential on the eve of their pedagogical relevance for students, their scientific usefulness for supervisors and their managerial impact on academic notoriety, through the monitoring of research subjects, study patterns and editorial quality. This atual study, specifically centered around Cardiology theses, builds upon the ongoing bibliometric research conducted at FMSo. Simultaneously, it aligns with the accreditation process, aiming to better integrate the pedagogical framework of professional competences and their societal responsibilities within the national health system. Its main objective was to delineate the bibliometric characteristics of Cardiology practice theses (research topics, study methodologies and editorial quality), supported at FMSo during the period 2000-2019. This analysis serves as a prerequisite for optimizing the transition of these theses into publishable articles.

METHODS

We conducted a bibliometric cross-sectional study encompassing all Cardiology practice theses supported at FMSo over two successive decades (2000-2019). The link to Cardiology was established based on the affiliation of the thesis's first university-hospital director within this discipline. Data collection involved compiling information from multiple sources, including the FMSo's official website, the theses registry, and the faculty library. Each Cardiology practice thesis underwent systematic review by two specialized medical researchers—one in Cardiology and the other in Preventive and Community Medicine. "For each thesis, we thoroughly examined the cover page (including details such as the doctoral student, supervisors, and defense date), the back matter (containing the abstract and indexing keywords), and the conclusion. To achieve this, we employed a data collection grid designed by the research group GRIF2D, which we applied to all included dissertations.

The typology of the theses—whether clinical, epidemiological, or fundamental—was determined based on the taxonomy of primary medical study types and the Evidence-Based Medicine (EBM) pyramid. Additionally, we identified the research theme by analyzing and grouping descriptors within the same nosological class, following the MeSH (MEDLINE) indexing structure.

To assess the quality of scientific writing, we reviewed the abstracts using an iso-weighted rating scale developed within the Research Laboratory LR19SP01. This scale adhered to the guidelines set forth by the International Committee of Medical Journal Editors (ICMJE). Abstracts were considered 'satisfactory' when the assigned rating reached or exceeded 75 out of a possible 100 points.

Data were captured and analyzed using the Statistical Product and Service Solutions (SPSS) statistical software.

We divided the results into two 10-year periods (2000-2009 and 2010-2019). Descriptive statistics—including absolute, relative, and cumulative frequencies for qualitative variables, as well as means, standard deviations, median, and quartiles for quantitative variables—were used to summarize the findings. Finally, we presented the results in both tabular and graphical formats, including radar diagrams.

RESULTS

During the two decades of this bibliometric study (2000-2019), 111 practice theses were defended in Cardiology at FMSo (Tunisia), with a median of five dissertations per year (IQR= [2-9]). The analysis of the characteristics of practice theses in Cardiology revealed a notable dominance of the use of the French language, with the exception of only one thesis written in English. A male predominance among the thesis candidates was noted (sex ratio: 1.85). In 61% of cases, the practice thesis in Cardiology was supervised by a single academic advisor, who was an Assistant Hospital-University Professor (AHU) in 43% of cases. When it came to co-supervision, "Pediatrics" was the most sought-after specialty (4.8%). Following their defenses, almost half of the theses received the highest distinction, "very honorable with congratulations from the jury and a proposal for a thesis award" (Table I).

Table I. General characteristics of 111 Cardiology practice theses, defended between 2000 and 2019, at the Faculty of Medicine of Sousse (Tunisia).

	2000-09 (N=48)		2000-19 (N=63)		2000-19 (N=111)		P
	n	%	n	%	n	%	
Language of the practice thesis							
French	48	100.0	62	98.4	110	99.1	0.999
English	-	-	1	1.6	1	0.9	
Gender of the student							
Feminine	16	33.3	23	36.5	39	35.1	0.885
Male	32	66.7	40	63.5	72	64.9	
Scientific Directors of practice thesis							
A director	29	60.4	39	61.9	68	61.3	0.999
Two directors	19	39.6	24	38.1	43	38.7	
Belonging to the same faculty	19	39.6 100.0	23	36.5 95.8	42	37.8 97.7	0.892
Of the same specialty	17	35.4 89.4	19	30.2 79.2	36	32.4 83.7	0.701
Belonging to the same department	15	31.2 78.9	19	30.2 79.2	34	30.6 79.1	0.999
Specialty of the co-director							
Cardiology	17	89.4	19	79.2	36	83.7	0.701
Pediatrics	-		2	8.2	2	4.8	0.640
Preventive and Community Medicine	-	-	1	4.2	1	2.3	0.383
Resuscitation	1	5.3	-	-	1	2.3	0.875
Pneumology	-	-	1	4.2	1	2.3	0.383
Hematology	-	-	1	4.2	1	2.3	0.383
Microbiology	1	5.3		-	1	2.3	0.875
Director/co-director: member of the thesis jury	8	16.7	2	3.2	10	9.0	0.032
Rank of the first Scientific Director							
University Hospital Assistant	15	31.2	33	52.4	48	43.2	0,041
Associate Lecturer	23	47.9	19	30.2	42	37.8	0.086
University Hospital Professor	10	10.8	11		21	18.9	0.832
Rank of Co-Scientific Director							
University Hospital Assistant	11	57.9	14	58.3	25	58.1	0.999
Associate Lecturer	7	36.8	4	16.7	11	25.6	0.264
University Hospital Professor	1		6	25.0	7	16.3	0.285
Non-academic guest during the presentation			2	3.2	2	1.8	0.639
Mention of the thesis							
Very Honorable and Congratulations of Jury	22	45.8	26	41.3	48	43.2	0.773
Proposal for thesis prizes*	26	54.2	37	58.7	63	56.8	

The total number of indexing lines for these academic dissertations was 537 lines, with the leading keywords found in almost one in four theses being "Myocardial Ischemia," "Echocardiography," "Angioplasty," "Treatment," and "Rhythm Disorders" (Table IIa). Among these keywords, 36 essential descriptors (one per dissertation) were selected through the indexing of major themes (Table IIb), with the "Top 10" including "Angioplasty," "Myocardial Ischemia," "Heart Failure," "Atrial Fibrillation," "Pacemaker," "Echocardiography," "Bacterial Endocarditis," "Hypertension," "Cardiomyopathy," and "Congenital Heart Diseases." Thus, 12 thematic domains (Table IIc) were identified, allowing the identification of three main and homogeneous groups of study subjects covering half (52%) of the practice theses in Cardiology: "Ischemic Heart Diseases" (28%), "Rhythm Disorders" (14%), and "Valvular Heart Diseases" (10%). The thematic trend over the two decades of study was marked by a significant decrease in dissertations related to "Valvular Heart Diseases" and "Carditis," at the expense of growth in those addressing "Ischemic Heart Disease." It is noteworthy that about one in three theses (32%) addressed a topic related to "Interventional Cardiology," with no significant difference between the two decades, as well as the emergence of a new thematic category in the second decade: "Sports Cardiology."

Table II. Research themes of the 111 practice theses in Cardiology, defended between 2000 and 2019 at the Faculty of Medicine of Sousse (Tunisia).

a. Main Indexing Descriptors

Descriptors (Keywords)	2000-2009 (N=252)		2000-2019 (N=537)		2000-2019 (N=537)		
	n	%	n	%	n	%	Cumulative %
Cardiology	44	17.5	23	8.1	67	12.5	12.5
Myocardial ischemia	11	4.4	19	6.7	30	5.6	18.1
Echocardiography	15	6.0	14	4.9	29	5.4	23.5
Angioplasty	12	4.8	15	5.3	27	5.0	28.5
Treatment	11	4.4	14	4.9	25	4.7	33.2
Arrhythmias	4	1.6	12	4.2	16	3.0	36.1
Cardiac stimulation	7	2.0	5	1.8	12	2.2	38.4
Surgery	8	3.2	3	1.1	11	2.1	40.4
Heart failure	3	1.2	7	2.5	10	1.9	42.3
Mortality	3	1.2	7	2.5	10	1.9	44.1
Prosthesis	5	2.0	5	1.8	10	1.9	46.0
Epidemiology	2	0.8	7	2.5	9	1.7	47.7
Congenital heart disease	5	2.0	4	1.4	9	1.7	49.2
Prognosis	3	1.2	5	1.8	8	1.5	50.7
Diabetes	4	1.6	3	1.1	7	1.3	52.0
Age	2	0.8	4	1.4	6	1.1	54.4
Rating	2	0.8	4	1.4	6	1.1	55.5
Results	4	1.6	2	0.7	6	1.1	56.6
Late complications	2	0.8	3	1.1	5	0.9	52.0
Coronary angiography	2	0.8	3	1.1	5	0.9	57.5
Endocarditis	4	1.6	1	0.4	5	0.9	58.5
Gynecology	3	1.2	2	0.7	5	0.9	59.4
Thrombosis	-	-	5	1.8	5	0.9	60.3
Diagnosis	2	0.8	2	0.7	4	0.7	61.1
Valve replacement	3	1.2	1	0.4	4	0.7	61.8
Thrombolysis	-	-	4	1.4	4	0.7	62.6
Valvopathy	2	0.8	2	0.7	4	0.7	63.3
Artery	2	0.8	1	0.4	3	0.6	62.9
Deadline	1	0.4	2	0.7	3	0.6	64.4
Risk factors	1	0.4	2	0.7	3	0.6	65.0
Left Ventricular Hypertrophy	-	-	3	1.1	3	0.6	65.5
Prevalence	1	0.4	2	0.7	3	0.6	66.1
Sports	-	-	3	1.1	3	0.6	66.7
Ablation	1	0.4	1	0.4	2	0.4	67.0
Sleep apnea syndrome	-	-	2	0.7	2	0.4	67.4
Atherosclerosis	2	0.8	-	-	2	0.4	67.8
Bacteriology	1	0.4	1	0.4	2	0.4	68.1
Cardiomyopathy	1	0.4	1	0.4	2	0.4	69.5
Other	79	31.4	86	30.2	165	30.5	100.0

Table II. Research themes of the 111 practice theses in Cardiology, defended between 2000 and 2019 at the Faculty of Medicine of Sousse (Tunisia).
b. Major Descriptors (Keywords)

Descriptors (Keywords)	2000-2009 (N=48)		2000-2019 (N=63)		2000-2019 (N=111)		
	n	%	n	%	n	%	Cumulative %
Angioplasty	6	12.5	8	12.7	14	12.6	12.6
Myocardial ischemia	5	10.4	9	14.3	14	12.6	25.2
Cardiac failure	4	8.3	3	4.8	7	6.3	31.5
Atrial fibrillation	-	-	7	11.1	7	6.3	37.8
Pacemaker	4	8.3	2	3.2	6	5.4	43.2
Echocardiography	2	4.2	3	4.8	5	4.5	47.7
Bacterial endocarditis	3	6.3	2	3.2	5	4.5	52.2
Hypertension	1	2.1	4	6.3	5	4.5	56.7
Cardiomyopathy	-	-	3	4.8	3	2.7	59.4
Congenital heart disease	1	2.1	2	3.2	3	2.7	62.1
Clopidogrel	1	2.1	2	3.2	3	2.7	64.8
Aortic valve disease	3	6.3	-	-	3	2.7	67.5
Mitral valve disease	1	2.1	2	3.2	3	2.7	70.2
Cardiac resynchronization	1	2.1	2	3.2	3	2.7	72.9
Sleep apnea syndrome	-	-	2	3.2	2	1.8	74.7
Atrioventricular canal	-	-	2	3.2	2	1.8	76.5
Atrial septal defect	1	2.1	1	1.6	2	1.8	78.3
Ventricular septal defect	1	2.1	1	1.6	2	1.8	80.1
Electrocardiography	2	4.2	-	-	2	1.8	81.9
Risk factor	1	2.1	1	1.6	2	1.8	83.7
Pericarditis	2	4.2	-	-	2	1.8	85.6
Valvular heart disease	1	2.1	1	1.6	2	1.8	87.4
Catheterization	-	-	1	1.6	1	0.9	88.3
Embolism and thrombosis	-	-	1	1.6	1	0.9	89.2
Pregnancy	1	2.1	-	-	1	0.9	90.1
Hyperglycemia	1	2.1	-	-	1	0.9	91.0
Ventricular hypertrophy	-	-	1	1.6	1	0.9	91.9
Lymphoma	1	2.1	-	-	1	0.9	92.8
Tricuspid valve disease	1	2.1	-	-	1	0.9	93.7
Myxoma	-	-	1	1.6	1	0.9	94.4
Phlebitis	1	2.1	-	-	1	0.9	95.5
Cardiac valve prosthesis	1	2.1	-	-	1	0.9	96.4
Thrombolysis	-	-	1	1.6	1	0.9	97.3
Fallot trilogy	1	2.1	-	-	1	0.9	98.2
Balloon valvuloplasty	-	-	1	1.6	1	0.9	99.1
Vasculitis	1	2.1	-	-	1	0.9	100.0

Table II. Research themes of the 111 practice theses in Cardiology, defended between 2000 and 2019 at the Faculty of Medicine of Sousse (Tunisia).
b. Thematic categories

Descriptors (Keywords)	2000-2009 (N=48)		2000-2019 (N=63)		2000-2019 (N=111)			P
	n	%	n	%	n	%	Cumulative %	
Ischemic heart disease	13	24.5	18	31.0	31	27.9	27.9	0.863
Arrhythmia	7	13.2	9	15.5	16	14.4	42.3	0.964
Valvular heart disease	8	15.1	3	5.2	11	9.9	52.2	0.079
Heart failure	4	7.5	7	12.1	11	9.9	62.1	0.879
Congenital heart disease	5	9.4	5	8.6	10	9.0	71.1	0.897
Cardiovascular risk factors	4	7.5	5	8.6	9	8.1	79.2	0.999
Cardites*	6	11.3	2	3.4	8	7.2	86.5	0.131
Cardiac investigations	2	3.8	2	3.4	4	3.6	90.1	0.999
Vascular diseases	2	3.8	2	3.4	4	3.6	93.6	0.999
Pregnancy and cardiovascular complications	1	1.9	2	3.4	3	2.7	96.3	0.999
Cardiac masses	1	1.9	1	1.7	2	1.8	98.1	0.999
Sports cardiology	-	-	2	3.4	2	1.8	100.0	0.319

*: Endocarditis, Myocarditis, Pericarditis

The profile of practice theses in Cardiology at the Faculty of Medicine of Sousse was dominated by a clinical approach (97%) with a "descriptive" type (55%). Over twenty years of study, the methodological trend was marked by a significant regression of "case reports" (number of cases ≤30), decreasing from 12 to only four theses. Socio-epidemiological, community, and pedagogical studies were rather rare. The prospective study design was adopted by one in five theses and remained stable over the study period (Table III).

Table IIII. Typology of study patterns of 111 practice theses in Cardiology, defended between 2000 and 2019, at the Faculty of Medicine of Sousse (Tunisia).

	2000-09 (N=48)		2000-19 (N=63)		2000-19 (N=111)		P
	n	%	n	%	n	%	
Type of study							
Clinical study	46	95.8	62	98.4	108	97.3	0.797
Case series (≤30 cases)	12	25.0	4	6.3	16	14.4	0.012
Descriptive study (>30 cases)	20	41.7	41	65.1	61	55.0	0.023
Prognostic study	8	16.7	6	9.5	14	12.6	0.403
Therapeutic study	3	6.3	8	12.7	11	9.9	0.424
Diagnostic study	2	4.2	3	4.8	5	4.5	0.999
Etiological study	1	2.1	-	-	1	0.9	0.865
Socio-epidemiological study	1	2.1	1	1.6	2	1.8	0.999
Pedagogical Study	1	2.1	-	-	1	0.9	0.865
Study design							
Prospective	10	20.8	11	17.5	21	18.9	
Retrospective and other	38	79.2	52	82.5	90	81.1	

On a scale of 100 points, the median writing score was 75 (IQR=[65-80]), increasing from 65 points (IQR=[60-75]) during the decade [2000-2009] to 80 points (IQR=[75-85]) during the subsequent decade [2010-2019]. Overall, 59% of cases achieved a "satisfactory" score (≥75/100), with a significant improvement observed between the two decades (31% versus 79%, $p < 0.01$). Among the 20 criteria of the writing quality assessment scale, the least respected elements were statistically related, "Confidence Intervals" (9%), documentary related, "MeSH" (46%), and writing-related, "Abbreviations in the abstract" (Figures 1a, 1b, Table IV).

Table IIV. Editorial quality of the summaries of the practice theses in Cardiology, defended from 2000 to 2019, at the Faculty of Medicine of Sousse (Tunisia).

Abstract Editorial Items	2000-09 (N=48)		2000-19 (N=63)		Total (N=111)		P
	n	%	n	%	n	%	
Presence of abstract	48	100.0	63	100.0	111	100.0	-
The title reflects the content of the study	48	100.0	62	98.4	110	99.1	0.586
The main results were presented	44	91.7	63	100.0	107	96.4	0.066
Absence of language errors	45	93.8	62	98.4	107	96.4	0.214
There were no abbreviations in the title	46	95.8	59	93.7	105	94.6	0.476
Title words were less than 15 (90 characters)	46	95.8	53	84.1	99	89.2	0.045
The study population was presented	40	83.3	58	92.1	98	88.3	0.132
The purpose of the study has been clarified	37	77.1	60	95.2	97	87.4	0.005
The conclusion was consistent with the results	33	68.8	57	90.5	90	81.1	0.015
Sentences are short (less than two lines)	35	72.9	51	81.0	86	77.5	0.219
The type of study was mentioned	30	62.5	55	87.3	85	76.6	0.002
The data collection source has been announced	32	66.7	53	84.1	85	76.6	0.027
Sentences didn't start with numbers	32	66.7	50	79.4	82	73.9	0.210
All the verbs are in the past in the results section	25	52.1	53	84.1	78	70.3	<0.001
The summary was structured (IMRaC)*	14	29.8	53	84.1	67	60.9	<0.001
No mention like (about, study of, contribution to...)	25	52.1	40	63.5	65	58.6	0.155
Averages were associated with standard deviations	16	33.3	43	68.3	59	53.2	<0.001
There were no abbreviations in the summary	26	54.2	25	39.7	51	45.9	0.093
The keywords were MeSH†	22	45.8	29	46.0	51	45.9	0.568
Confidence intervals were given, if sampled	3	6.3	7	11.1	10	9.0	0.511
Satisfactory editorial quality (score ≥ 75%)	15	31.3	50	79.4	65	58.6	<0.001

**IMRaC: Introduction, Methods, Results, and Conclusion* *† MeSH=Medical Subject Heading*

DISCUSSION

Practice dissertation in medicine, a laborious and time-consuming pedagogical challenge for both doctoral students and their scientific supervisors [8], is an opportunity for scientific publication ensuring institutional visibility and academic performance. To bridge the gap between the plethora of dissertations and the scarcity of publications, it is crucial to reflect on optimizing practice theses and systematically transforming them into publishable scientific articles. It is in this context of monitoring dissertations in Cardiology, that this bibliometric study is integrated, continuing the tradition of similar investigations across various academic specialties at the FMSo [4,9]. Despite encountering certain challenges inherent to bibliometric methodology, particularly related to accessing defended theses, we addressed these issues by cross-referencing multiple data sources [8]. The consultation of the front and back covers of the practice theses, the «showcases» of scientific dissertations, did not compromise the methodological validity of our bibliometric study. In addition, the editorial quality of the practice theses was assessed according to their compliance with the Vancouver Group's scientific medical writing principles [10]. The bibliometric profile of these academic dissertations revealed several key findings. First, there was a moderate production of exercise theses in Cardiology, with limited interdisciplinary collaboration. Furthermore, writing proficiency in French appeared stagnant, and academic evaluation standards were relatively lenient. Notably, the thematic choices within these dissertations tended to be hyperspecialized, and study patterns often reflected a lower level of complexity. Overall, the editorial quality was generally satisfactory.

With an average of five practice theses per year at FMSo, the academic productivity of Cardiology was comparable on a national [4] and Maghrebian scale [11]. Representing half the output of 'Preventive and Community Medicine'[9], Cardiology ranked in the "Top 10" list of the most prolific disciplines in practice theses [12]. Despite these achievements, interdisciplinary collaboration has experienced a reduction, akin to trends observed in other European Cardiology Centers. This decline occurs despite significant advances resulting from the interdisciplinary exchange between clinical medicine, basic sciences, and public health [13,14]. Interestingly, only one practice thesis in Cardiology was written in English. This stands out considering that English serves as the dominant language for global scientific production and features prominently in the 'TOP 40' journals. However, this linguistic shift poses challenges for achieving international visibility [15]. These difficulty was also documented in France [16] underscore the need to promote English usage in scientific medical writing. Additionally, providing an extended 'General Public' summary in the native language remains essential, with regard to the societal responsibility of local science [12]. Compared to other medical specialties at FMSo and other medical schools, Cardiology boasts a high rate of practice theses that have earned the distinction of 'Very Honorable with jury congratulations and proposal for thesis prize [4,17]. However, it's important to recognize that such assessments remain somewhat 'subjective and arbitrary' [18]. Moving forward, the primary criterion for awarding the 'proposal at the thesis prize' should be the publication of the practice thesis in an indexed scientific journal [19].

Relevant research topics

Following Tunisia's epidemiological transition, which has witnessed an increase in cardiovascular risk factors and a corresponding rise in mortality, the focus of practice theses in Cardiology at FMSo has shifted. Specifically, there has been a decline in topics related to communicable diseases (including rheumatic fever) and a surge in those related to non-communicable, chronic, and degenerative conditions [20]. Notably, dissertations concerning infectious and inflammatory pathology experienced a significant decrease over the two study decades (from 26.4% to 8.6%, $p < 0.001$). Meanwhile, practice theses in Cardiology increasingly addressed coronary pathology (rising from 32% to 40%) as well as heart failure and atrial fibrillation. The thematic diversity of dissertations in Cardiology at FMSo arises from the need to balance two critical aspects. On one hand, there is the social relevance of scientific research within an accredited Medical School, driven by societal responsibility. On the other hand, Cardiology is a hyperspecialized discipline that continually evolves with the introduction of new techniques, such as cardiac catheterization. This intersection of priorities creates several pedagogical challenges, particularly for residents in "Family Medicine." These residents may be required to explore highly specialized health issues that they will likely never encounter in their long professional careers on the front lines [21]. Consequently, optimizing the distribution of practice thesis topics in Cardiology becomes crucial. It involves aligning community health needs (as relevant to Family Medicine residents) with

scientific demands (as relevant to Cardiology residents).

Basic Methodology of Academic Dissertations

EBM is an approach that encourages practitioners to judiciously utilize the most reliable data (evidence) for personalized patient care. To practice EBM effectively, critical analysis of information is essential to extract different levels of evidence. These levels are often represented in the form of a pyramid, with synthetic studies (such as systematic reviews and meta-analyses) at the top. Conversely, observational studies, including case series and narrative reviews without reproducible methodology, occupy the base of the EBM pyramid [22]. Interestingly, at FMSo, seven out of ten practice theses in Cardiology were categorized as 'descriptive studies' or 'case series.' This trend mirrors the situation at the Faculty of Medicine in Monastir, where descriptive studies and case series accounted for a substantial 81% of medical dissertations [4]. This tendency to lean towards simple methodological study designs in academic dissertations has also been observed in Bordeaux [23] and in many Arab countries [24]. Despite the decline of the "case series" studies in Cardiology theses at FMSo, over the two decades of study (from 26% to 6.4%), other reports showed their prevalence such as at the Faculty of Medicine of Tunis, where 29% of all theses, across all specialties, were "case series" [25]. Similar findings were observed during the 2000s in Maghrebian countries, where case reports held a prominent place in congresses and scientific publications [26]. However, the notable decline in Cardiology theses of "case series" type aligned with the paradigm of EBM. The thesis committees at our faculty recommend that 'the number of cases should exceed 30' to enhance the scientific credibility of academic dissertations. Contrary to time and cost pressures [27], early enrollment in thesis topics, alignment with the resident's medical specialty, and the openness of laboratories and research units to students all contribute to the adoption of high-level evidence-based research methodologies and, consequently, the production of excellent dissertations.

Satisfactory scientific drafting of practice theses

The editorial quality of the exercise theses in Cardiology at FMSo was considered "satisfactory" (Score ≥75/100) in 59% of cases as compared to other faculty disciplines, like "Preventive and Community Medicine" (48%), using the same standardized evaluation grid [9]. Notably, there was a significant improvement over two decades of study—from 31% to 79% ($p < 0.001$). Similar trends were observed in other studies at FMSo and the Faculty of Dental Medicine in Monastir [28]. Despite this progress, certain editorial weaknesses persisted, particularly in three competences that FMSo doctoral students had not fully mastered: biostatistics, documentary research [17]. Interestingly, these deficiencies were also highlighted in recent research from Peruvian institutions, where doctoral students struggled with statistical skills (49%) and documentary research (22%) [29]. Regarding editorial inadequacies, similar issues were also reported at the Faculty of Medicine in Tunis[30]. These findings highlight a gap in the medical studies curriculum, specifically related to learning scientific medical writing. Hence, there is a need to improve the scholarly competence in health science faculties [31]. By doing so, students would be better equipped to calculate the required sample size for epidemiological or clinical studies, present results in a scientific context, and identify potential biases (such as information bias, selection bias, and confounding) in manuscripts. Notably, universities worldwide are actively addressing this need by providing training workshops on bibliographic research tools and scientific writing.

Lastly, this bibliometric study of academic dissertations in Cardiology at FMSo revealed several noteworthy findings. First, there was a hyperspecialized thematic predominance, which diverged from the faculty's intended focus on transversal and socially responsible education centered around "Family Medicine" and aligned with the health needs of the general population. Second, the study designs exhibited a low level of evidence and remained somewhat oriented toward single-discipline approaches, lacking multidisciplinary and synthetic perspectives. However, there was a positive trend in the overall editorial quality, consistent with good practices. Notably, transforming traditional practice theses into publishable article projects could enhance their visibility and impact at educational, professional, and editorial level.

CONCLUSION

RVFWS and RV FAC seem to be strong predictors of prognosis in patients with AHF and reduced ejection fraction.

A study showing the prognostic interest of right ventricular echocardiographic parameters on cardiovascular mortality and rehospitalization for heart failure in acute heart failure with preserved ejection fraction and with mildly reduced ejection fraction could be a good perspective for the future.

REFERENCES

1. Brenner M, Weiss-Breckwoldt AN, Condrau F, Breckwoldt J. Does the 'Educational Alliance' conceptualize the student - supervisor relationship when conducting a master thesis in medicine? An interview study. BMC Med Educ. 28 août 2023;23(1):611.
2. Azzaza M, Mabrouk GB, Chebil D, Nouira S, Melki S, El Haddad N, et al. Forty-year Tunisian bibliometrics of general surgery theses in the four national faculties of medicine (1980–2019). Libyan Journal of Medicine. 2022;17(1).
3. Pietrucha J. Country-specific determinants of world university rankings. Scientometrics. mars 2018;114(3):1129-39.
4. Salem KB, Bouanene I, Mosbahi N, Elmhamdi S, Soltani MS, Abdelaziz AB. Profil bibliométrique et devenir des thèses soutenues à la faculté de médecine de Monastir (Tunisie). Pédagogie Médicale. 2011;12(3):169-78.
5. Alaya B. Bibliometrics of Tunisian publications in preventive and community medicine, indexed in the Medline database (1975-2014). La Tunisie Medicale. 2018;96(10-11):719-30.
6. KapooR R, Sachdeva S, ZacKS JS. An analysis of Global Research Trends in Cardiology over the last two decades. Journal of Clinical and Diagnostic Research: JCDR. 2015;9(1):OC06.
7. Hao Y, Li B, Huber SA, Liu W. Bibliometric analysis of trends in cardiac aging research over the past 20 years. Medicine. 2023;102(34):e34870.
8. Ben Abdelaziz A, Zanina Y, Ben Hassine D, Ben Abdelaziz A, Azzaza M. Facteurs prédictifs de la publication de la thèse de Doctorat à la Faculté de Médecine de Sousse (Tunisie). Tunis Med. 2023;101(7):9.
9. El Haddad N, Chebil D, Melki S, Nouira S, Azzaza M, Abdelaziz AB. Thematic, methodological, and editorial trends of preventive and community medicine theses in Tunisia over forty years. Educación Médica. 2023;24(1):100772.
10. Zhou Q. Recommendations for the conduct, reporting, editing and publication of scholarly work in medical journals. Zhonghua gan zang bing za zhi= Zhonghua ganzangbing zazhi= Chinese journal of hepatology. 2014;22(10):781-91.
11. Abd Elwehab MAK. Le devenir des thèses soutenues à la Faculté de Médecine et de Pharmacie de Marrakech de 2006 à 2021. Faculty of Medicine and Pharmacy of Marrakech;
12. Abdelaziz AB, Errafei A, Melki S, Abdelaziz AB, Chebil D, Azzaza M. Profil bibliométrique de la thèse de Doctorat à la Faculté de Médecine de Sousse (Tunisie). La Tunisie Médicale. 2021;99(12):1156.
13. Ge Y, Chao T, Sun J, Liu W, Chen Y, Wang C. Frontiers and hotspots evolution in psycho-cardiology: a bibliometric analysis from 2004 to 2022. Current problems in cardiology. 2022;47(12):101361.
14. 14. Bueno H. Cardiovascular research continuity: a call for greater collaboration between cardiology and emergency care researchers. Emergencias: revista de la Sociedad Espanola de Medicina de Emergencias. 2015;27(6):396-8.
15. 15. Abad J, Alencar RM, Marimon Jr BH, Marimon B, Silva AC, Jancoski H, et al. Publishing in English is associated with an increase of the impact factor of Brazilian biodiversity journals. Anais da Academia Brasileira de Ciências. 2020;92:e20181263.
16. Abi Raad V, Raad K, Daaboul Y, Korjian S, Asmar N, Jammal M, et al. Medical education in a foreign language and history-taking in the native language in Lebanon – a nationwide survey. BMC Med Educ. déc 2016;16(1):298.
17. Abdelaziz AB, Errafei A, Nouira S, Abdelaziz AB, Chebil D, Azzaza M. Qualité rédactionnelle de la thèse de Doctorat à la Faculté de Médecine de Sousse (Tunisie). La Tunisie Médicale. 2022;100(5):396.
18. Pérez-Ros P, Chust-Hernández P, Ibáñez-Gascó J, Martínez-Arnau FM. An undergraduate thesis training course for faculty reduces variability in student evaluations. Nurse Education Today. 2021;96:104619.
19. Boly A, Tachfouti N, Zohoungbogbo ISS, ElAchhab Y, Nejjari C. Évaluation de la qualité méthodologique des thèses soutenues à la Faculté de Médecine de Fès. 1995;1.
20. Romdhane B, Haouala H, Belhani A, Drissa H, Kafsi N, Boujnah R, et al. Epidemiological transition and health impact of cardiovascular disease in Tunisia. La Tunisie Medicale. 2005;83:1-7.
21. Abdelaziz AB, Nouira S, Chebil D, Azzaza M, Barhoumi T, Salem KB. La Médecine de Famille (Médecine Générale): Quelles spécificités académiques et professionnelles? La Tunisie Médicale. 2021;99(1):29.
22. Murad MH, Asi N, Alsawas M, Alahdab F. New evidence pyramid. BMJ Evidence-Based Medicine. 2016;21(4):125-7.
23. Labernède M. Les thèses dans la filière de médecine générale: étude descriptive des thèses des futurs médecins généralistes soutenues à Bordeaux entre. Médecine Humaine Pathologie. 2007;
24. Tadmouri GO, Mandil A, Rashidian A. Biomedical and health research geography in the Eastern Mediterranean Region. East Mediterr Health J. 2019;25(10):728-43.
25. Elloumi H, Bouarrouj R, Mrabet A, Dziri C. Theses defended at Tunis Faculty of Medecine from 2004 to 2005: Scientific become and predictive factors of publications. La Tunisie

Medicale. 2017;95(4):236-41.

26. Melki S, Chebil D, Azzaza M, Quessar A, Bezzaoucha A. Bilan de 25 ans de recherche médicale scientifique au Grand Maghreb. Analyse bibliométrique de la plateforme Scimago (1996-2020). 2021;
27. Burns PB, Rohrich RJ, Chung KC. The levels of evidence and their role in evidence-based medicine. Plastic and reconstructive surgery. 2011;128(1):305-10.
28. Khemiss M, Guedri B, Khélifa MB. Qualité rédactionnelle et devenir des thèses soutenues à la Faculté de Médecine Dentaire de Monastir (2014-2018). La Tunisie Médicale. 2021;99(3):348.
29. Ipanaqué-Zapata M, Figueroa-Quinones J, Bazalar-Palacios J, Arhuis-Inca W, Quinones-Negrete M, Villarreal-Zegarra D. Research skills for university students' thesis in E-learning: Scale development and validation in Peru. Heliyon. 2023;9(3).
30. Mrabet A, Abidi E, Dziri C. Impact of pathology theses supported at the medical university of Tunis (2000-2010). La Tunisie Medicale. 2016;94(3):172-5.
31. Chebil D, Nouira S, Mkacher H, Yahia F, Barhoumi T, Salem B, et al. Successful Bibliographic Research on PubMed. La Tunisie Medicale. 2020;98(5):370-7.