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Thematic, methodological, and editorial trends of preventive and community medicine theses in Tunisia over forty years

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Abstract
Introduction: The assessment of the medical doctoral dissertation is a preliminary step in the promoting of scientific writing. this study aimed to describe the research topics, study designs and quality writing of Preventive and Community Medicine academic dissertations in Tunisia.
Material and Methods: It's a bibliometric study covering the Preventive and Community Medicine doctoral dissertations performed in the faculties of medicine of Tunisia over forty years (1980-2019). The research topics were determined from the descriptors, grouped into major descriptors and thematic groups. The types of studies were classified according to the Evidence-Based Medicine pyramid. The editorial quality assessment was based on a 20-item grid, deduced from the International Committee of Editors of Medical Journals repository, and applied to the abstracts of thesis. It was considered satisfactory if the score was ≥75/100 points.
Results: In total 595 PCM doctoral dissertations were performed in 40 years. Themes of dissertations were studied through 2580 index lines and 1030 descriptors. Healthcare-associated infections, maternal health, smoking, and high blood pressure accounted for 25.4% among major descriptors. The major research category evolved from "family medicine and primary care" (40.9%) before 2000 to management of health facilities" (26.7%) after 2000. The study designs were population studies or synthesis research, respectively in 259 (43.5%) and 22 (3.7%) doctoral dissertations. The quality of scientific writing was satisfactory in 34.6% of doctoral dissertations globally.
Conclusion: Preventive and Community Medicine doctoral dissertations suffered from methodological and editorial shortcomings, which required their reform based on bibliometric assessment, capacity building and structural reform.

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PALABRAS CLAVE
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Medicina Preventiva;
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Disertación académica;
Escuelas, Medicina;
Escritura médica

Tendencias temáticas, metodológicas y editoriales de las tesis de Medicina Preventiva y Comunitaria en Túnez durante cuarenta años

Resumen
Introducción: Este estudio tuvo como objetivo describir los temas de investigación, los diseños de estudio y la redacción de calidad de las disertaciones académicas de Medicina Preventiva y Comunitaria en Túnez.
Material y métodos: Es un estudio bibliométrico exhaustivo que cubre las tesis doctorales de Medicina Preventiva y Comunitaria realizadas en las facultades de medicina de Túnez (Túnez, Sousse y Monastir) durante cuarenta años (1980-2019). Los temas de investigación se determinaron a partir de los descriptores, agrupados en grandes descriptores y grupos temáticos. Los tipos de estudios se clasificaron según la pirámide de la Medicina Basada en la Evidencia. La evaluación de la calidad editorial se basó en una grilla de 20 ítems, deducida del repositorio del Comité Internacional de Editores de Revistas Médicas, y aplicada a los resúmenes de tesis. Se consideró satisfactorio si la puntuación era $\geq$ 75/100 puntos.
Resultados: En total se realizaron 595 tesis doctorales PCM en 40 años. Los temas de las disertaciones se estudiaron a través de 2580 líneas de índice y 1030 descriptores. Las infecciones asociadas a la atención de la salud, la salud materna, el tabaquismo y la hipertensión arterial representaron el 25,4% entre los principales descriptores. La principal categoría de investigación evolucionó de "medicina familiar y atención primaria (40,9%) antes del 2000 a la gestión de establecimientos de salud" (26,7%) después del 2000. Los diseños de estudio fueron estudios de población o investigación de síntesis, respectivamente en 259 (43,5 %). y 22 (3,7%) tesis doctorales.
Conclusión: Además de su diversidad temática, las tesis doctorales de Medicina Preventiva y Comunitaria adolecieron de deficiencias metodológicas y editoriales, que exigieron su reforma a partir de la evaluación bibliométrica, el desarrollo de capacidades y la reforma estructural.

Introduction

The scientific productivity of medical schools has been the subject of several bibliometric studies,[1–4] allowing the conduct of a "benchmarking", promoting competition among universities.[5] A doctoral dissertation, also known as the academic thesis, is defined as a long essay involving personal medical research, written by the medical student for the university degree. It is often a core component of the studies qualification.[6] It is a personal investment under the supervision of a qualified university hospital teacher and the administrative support of the faculty of medicine.[7] The doctoral dissertation is also unique because of its key role with the possibility of methodological evolution,[8] and the solutions to perceived gaps between healthcare research and practice.[9] However, the doctoral dissertation can represent a discomfort for the candidates as well as their supervisors, which may affect the pertinence of their scientific productivity.[10] The discomfort of students is particularly evident during the scientific writing by lack of pedagogic training in concise scientific writing. In fact, rules for concise scientific writing of a doctoral dissertation as well as the format for writing have been formally established, helping to provide a basic structure around which to create one's masterpiece.[11,12]

In Tunisia, all the faculties of medicine have a community orientation, piloted by the departments and services of Preventive and Community Medicine (PCM) which ensured the strategies promoting population health and the training of new medical researchers as for research methodology, scientific writing and scientific communication.[13] In fact, the PCM specialty defends social responsibility by encouraging the education of the most common diseases and conditions in the community and by guiding the national medical research to promote healthcare. PCM specialty would also be an observatory for monitoring the trend of national medical research through more consistency with the global burden of disease, more compliance with the high-level research specifications of proof and more adequacies with the editorial standards of scientific writing.

Therefore, the development of longitudinal bibliometric research in the specialty of PCM can only enrich the debate on the doctoral dissertation reform, particularly when concerning the choice of themes, levels of Evidence-Based-Medicine and the writing patterns in accordance following the gold standard of the scientific medical papers. Despite

several bibliometric studies examining the productivity of dissertations in medical schools,[13–19] no national research has currently covered all medical schools of Tunisia, and such national studies would be necessary for the strengthening of national scientific research and its orientation towards more adequacy with the needs of population. This study aimed to describe trends, main research themes, study designs and the quality of scientific writing of doctoral theses in PCM in Tunisia over the last forty years (1980-2019).

Materials and Methods

Study design

It's a descriptive bibliometric study. It concerned all doctoral dissertations in the field of PCM in the national medical faculties of Tunisia (Tunis, Sousse, and Monastir) during the four past decades (1980-2019). Doctoral dissertations performed before 1980 and those performed in the faculty of medicine of Sfax were not included in statistical analysis for methodological reasons. All doctoral dissertations directed by hospital university teachers specialized in PCM, which were cited in the first position, and performed in the three faculties of medicine of Tunisia were included.

Data collection

Data were collected through a compilation of multiple sources: Direct consultation of doctoral dissertations in the faculties' libraries, online databases available on the websites of the faculties and the contact of all the university hospital teachers specialized in PCM via emails to valid the list of included dissertations. The cover pages, abstracts and/or conclusions of each doctoral dissertation were systematically and thoroughly analyzed twice by two different medical investigators specialists in PCM. In case of divergent opinions in the assessment, the opinion of a well-qualified senior in the discipline was considered decisive. A standardized data collection grid was developed for the purposes of the study. Three lines of research were investigated: research themes, study design and editorial components and quality of scientific writing.

Research themes were drawn from indexing lines reported in the cover pages of dissertations. Among the list of indexing lines of each thesis, only one essential descriptor was chosen by the research team, after reading the abstracts and/or conclusions of the dissertations. All the synonymous descriptors, which can be grouped in the same nosological framework, were subsequently replaced by major descriptors. Then, the major descriptors were divided into homogeneous major categories, merging them according to the essential themes, which has simplified the analysis and reading of the themes of the PCM dissertations during the 40 years of study. The following major categories of research fields in preventive medicine were used: communicable diseases, non-communicable diseases, traumatism, violence and war, environmental health, management of health institutions, determinants of health (behaviors, attitudes, ...), education of health sciences, and family medicine and primary healthcare.

Study designs were classified according to a standardized typology. This classification was inspired by the classical taxonomy of epidemiological studies and the pyramid of the Evidence-Based-Medicine.

As for the scientific writing assessment, it was applied only to dissertations having abstracts; it was analyzed according to an iso-weighted scale, composed of 20 items, covering all the components of the dissertations' abstract. The items of good scientific medical writing were deduced from the latest version of the Standard Recommendations of the International Committee of Editors of Medical Journals (ICMJE).[12] This scale, developed by the BIBLIO thesis thematic group of the UR12SP36 Research Unit, was transformed into a score of 100 points, by multiplying, by five the final values of the scale. The scientific medical writing was considered satisfactory in the presence of a thesis summary and an evaluation score for the items of the abstract reading grid of 75% or more.

Statistical analysis

Data entry and analysis were performed using Statistical Package for the Social Sciences for Windows Version 20.0 (SPSS Inc., Chicago, IL, USA). Results were stratified according to periods of 20 years each: before 2000 and after 2000, and to the medical faculties.

Results

In total, 595 doctoral dissertations in PCM were identified in the faculties of medicine of Tunis, Sousse, and Monastir over the last 40 years with 244 dissertations performed in the faculty of medicine of Sousse, 196 in Tunis and 155 in Monastir. The average was 14.9 dissertations per year. During the study period, 52 PCM teachers contributed to the supervision of medical students, most of them (44.2%) were from the Faculty of Medicine of Tunis.

Bibliometric characteristics of doctoral dissertations

The mean age of medical doctoral students at the time of their doctoral dissertations presentations was 29.8 ± 2.4 years with extremes ranging from 24 years to 46 years. A female predominance was noted with a sex ratio of 0.74. Associate professors have supervised 42.7% of doctoral dissertations with a co-direction observed in 33.4% of dissertations. Resuscitation, occupational medicine, psychiatry, and pediatrics were the most common specialties of co-directors (table 1).

Research themes

The total number of indexing lines used by authors was 2580 with 1030 descriptors. Major descriptors were represented mostly with healthcare-associated infections, maternal health and Tobacco use (19.7%) as shown in table 2. Topics varied according to the periods and faculties. In fact, while family medicine and primary care were the most common thematic categories before 2000, the management of

Table 1 Characteristics of Doctoral Dissertations in Preventive and Community Medicine performed in Tunisia (1980 – 2019), n (%).

	Faculty of Medicine of Sousse			Faculty of Medicine of Tunis			Faculty of Medicine of Monastir			Total Faculties of Medicine of Tunisia		
	1980–1999 (n=46)	2000–2019 (n=198)	1980–2019 (n=244)	1980–1999 (n=105)	2000–2019 (n=91)	1980–2019 (n= 196)	1980–1999 (n=35)	2000–2019 (n=120)	1980–2019 (n=155)	1980–1999 (n=186)	2000–2019 (n=409)	1980–2019 (N=595)
Language												
French	45 (97.8)	193 (97.5)	238 (97.5)	105 (100.0)	91 (100.0)	196 (100.0)	35 (100)	117 (97.5)	152 (98.1)	185 (99.5)	401 (98.0)	586 (98.5)
English	-	5 (2.5)	5 (2.0)	-	-	-	-	3 (2.5)	3 (1.9)	-	8 (2.0)	8 (1.3)
Arabic	1 (2.2)	-	1 (0.4)	-	-	-	-	-	-	1 (0.2)	-	1 (0.2)
Sex of the student												
Female	31 (67.4)	87 (43.9)	118 (48.4)	75 (71.4)	20 (22.0)	95 (48.5)	15 (42.9)	26 (21.7)	41 (26.5)	121 (65.1)	133 (32.5)	341 (57.3)
Male	15 (32.6)	111 (56.1)	126 (51.6)	30 (28.6)	71 (78.0)	101 (51.5)	20 (57.1)	20 (57.1)	114 (73.5)	65 (34.9)	276 (67.5)	254 (42.7)
Directors												
One Director	33 (71.7)	104 (52.5)	137 (56.1)	86 (81.9)	76 (83.5)	162 (82.7)	16 (45.7)	81 (67.5)	97 (62.6)	135 (72.6)	261 (63.8)	396 (66.6)
Two Directors	13 (28.3)	94 (47.5)	107 (43.9)	19 (18.1)	15 (16.5)	34 (17.3)	19 (54.3)	39 (32.5)	58 (37.4)	51 (27.4)	148 (36.2)	199 (33.4)
Co-directors belonging to other specialties	4 (8.7)	46 (23.2)	50 (20.5)	9 (8.5)	15 (16.5)	24 (12.2)	13 (37.2)	27 (22.5)	40 (25.8)	26 (14.0)	88 (21.5)	114 (57.3)
Specialty of co-directors												
Community medicine	9 (19.6)	48 (24.3)	57 (23.4)	10 (9.5)	-	10 (5.1)	6 (17.1)	12 (10.0)	18 (11.6)	25 (13.4)	60 (14.7)	85 (14.3)
Resuscitation	-	4 (2.0)	4 (1.6)	2 (1.9)	2 (2.2)	4 (2.0)	-	1 (0.8)	1 (0.6)	2 (1.1)	7 (1.7)	9 (1.5)
Occupational medicine	2 (4.3)	5 (2.5)	7 (2.7)	-	-	-	-	-	-	2 (1.1)	5 (1.2)	7 (1.2)
Psychiatry	-	2 (1.0)	2 (0.8)	-	1 (1.1)	1 (0.5)	1 (2.8)	2 (1.6)	3 (1.9)	1 (0.5)	5 (1.2)	6 (1.0)
Pediatric	-	2 (1.0)	2 (1.0)	-	-	-	3 (8.6)	-	3 (1.9)	3 (1.6)	2 (0.5)	5 (0.8)
obstetrics and gynecology	-	4 (2.0)	4 (2.0)	-	-	-	1 (2.3)	-	1 (0.6)	1 (0.5)	4 (1.0)	5 (0.8)
Other specialties	2 (4.3)	29 (14.6)	31 (12.7)	7 (6.7)	13 (14.3)	19 (9.7)	8 (22.8)	24 (20.0)	32 (20.6)	17 (9.1)	65 (15.9)	82 (13.8)
A director/ co-director was member of the jury	40 (87.0)	12 (6.1)	52 (21.3)	31 (29.5)	12 (13.2)	46 (23.5)	28 (80.0)	9 (7.5)	37 (24.0)	99 (70.2)	33 (8.1)	135 (24.4)

Table 2 Major descriptors used for indexation of Medical Doctoral Dissertations in the field of Preventive and Community Medicine performed in Tunisian Faculties of Medicine between 1980-2019.

Major descriptors	1980–1999 N=186		2000–2019 N=409		1980–2019 N=595		
	n	%	n	%	n	%	Cumulative %
Healthcare associated infections	4	**2.2**	34	**8.3**	38	**7,4**	7.4
Maternal health	17	**9.1**	18	**4.4**	35	**6,4**	13.8
Tobacco use	5	**2.7**	29	**7.1**	34	**5,9**	19.7
Arterial hypertension	4	**2.2**	19	**4.6**	23	**5,7**	25.4
Security of healthcare	1	**0.5**	20	**4.9**	21	**3,9**	29.3
Diabetes	6	**3.2**	14	**3.4**	20	**3,5**	32.8
Cardiovascular diseases	3	**1.6**	17	**4.2**	20	**3,4**	36.2
Child Health	7	**3.8**	12	**2.9**	19	**3,4**	39.6
Yong and adolescents	7	**3.8**	11	**2.7**	18	**3,2**	42.8
Drugs/ prescriptions	7	**3.8**	11	**2.7**	18	**3,0**	45.8
services and Healthcare	8	**4.3**	10	**2.4**	18	**3,0**	48.8
Quality of Healthcare	2	**1.1**	15	**3.7**	17	**3,0**	51.8
Cancer	1	**0.5**	13	**3.2**	14	**2,9**	54.7
Reproductive Health	7	**3.8**	7	**1.7**	14	**2,4**	57.1
General medicine practice	2	**1.1**	11	**2.7**	13	**2,4**	59.5
Hospital hygiene	-	**-**	12	**2.9**	12	**2,2**	61.7
Obesity	-	**-**	11	**2.7**	11	**2,0**	63.7
Hospital morbidity	4	**2.2**	7	**1.7**	11	**1,8**	65.5
Elderly	6	**3.2**	7	**1.7**	10	**1,8**	67.3
Viral hepatitis	2	**1.1**	6	**1.5**	8	**1,7**	69.0

healthcare Institutions was the most common topic after 2000. The faculties of medicine of Tunis and Monastir were most interested in family medicine and primary care. In contrast, the faculty of medicine of Sousse was mostly interested in the management of healthcare Institutions (fig. 1).

Study designs of doctoral dissertations

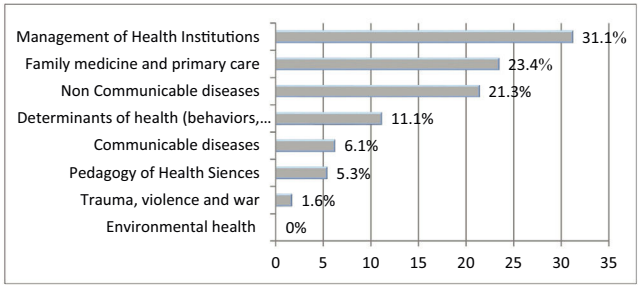
Original research represented 94.5% of total doctoral dissertations. The most common study designs were clinical and population studies. Among clinical research, prevalence and incidence studies represented the most frequent types (22.1%). As for population research, they were dominated by descriptive studies (38% of all investigated doctoral dissertations). Study designs were globally similar between the two periods excepting the pedagogic dissertations, bibliometrics and systematic reviews which were mainly performed after the year 2000 in Sousse and Monastir (table 3).

Editorial components of Tunisian Medical Doctoral Dissertations

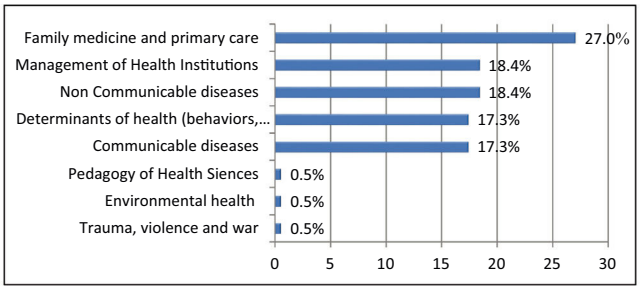
The most respected items in the scientific writing of the doctoral dissertations were "the title reflected the content" and "main results were presented". The least respected items in the scientific writing were "presenting Confidence Intervals if sampling" and "short sentences in abstracts" (table 4). As for the totality of investigated doctoral dissertations (with or without abstracts), it was found that the quality of scientific writing was satisfactory in 34.6% of doctoral dissertations globally. Variability between periods and faculties was notified; the best quality of scientific writing was found during the period between 2000 and 2019 (43.4%) and in the faculty of medicine of Sousse (48.5%) as shown in table 5.

Discussion

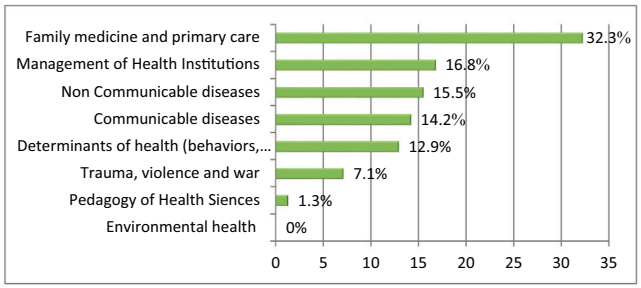
The bibliometrics of doctoral dissertations performed in the Tunisian faculties of medicine represents a pertinent tool to get an overview of the medical research in Tunisia. In the present study, the major problems with bibliometric methods at a policy level were related to data access and complexity.[20] In fact, some selection bias could be done. However, in our context, this bias was limited by directly consulting the libraries of our faculties of medicine as well as their websites, and by contacting all the doctoral dissertations directors to validate our list of included doctoral dissertations. Another methodology limitation that could be encountered in this study was related to information bias while determining the methodology of each doctoral dissertation; however, to limit this type of error, the determination of methodology of each doctoral dissertation was made by two trained investigators of our medical stuff based on the taxonomy of Evidence-Based-Medicine. Information bias in this study may also be related to the classification of doctoral dissertation according to the quality of their medical redaction. In fact, doctoral dissertations with a score ≥75% were classified as satisfactory. The number of doctoral dissertations with unsatisfactory editorial quality could be amplified. But this



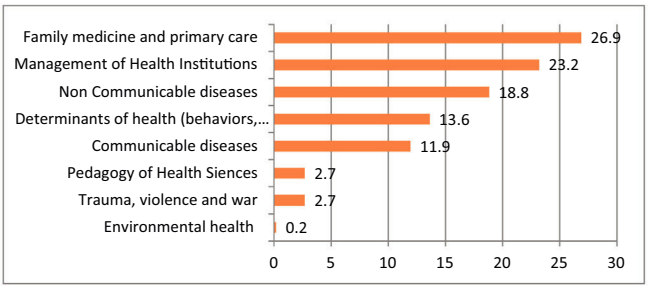
a) Thematic categories of Medical Doctoral Dissertations performed in the Faculty of Medicine of Sousse from 1980 to 2019.



b) Thematic categories of Medical Doctoral Dissertations performed in the Faculty of Medicine of Tunis from 1980 to 2019.



c) Thematic categories of Medical Doctoral Dissertations performed in the Faculty of Medicine of Monastir from 1980 to 2019.



d) Thematic categories of Medical Doctoral Dissertations performed in the Faculty of Medicine of Tunisia from 1980 to 2019.

Fig. 1 Thematic categories of Medical Doctoral Dissertations performed in the national Faculties of Medicine of Tunisia from 1980 to 2019. a) Sousse, b) Tunis, c) Monastir, d) all faculties.

classification has been applied for all dissertations since 1980, two years already after the Vancouver Convention which was requiring the various guidelines of scientific writing.

In total, a well-chosen thematic was always noted, which was always adapted to the epidemiological transition and the evolution of the population's health needs. However, the methodology designs were globally at the base of the Evidence-Based-Medicine pyramid. As for the quality of scientific writing of doctoral dissertations, it has been improved during decades, however, it remains still insufficient and should be controlled.

An adequate choice of themes

The choice of the theme of any research must be well guided, and only significant original topics that will add contributions to science and those that will fill a problematic gap in existing evidence are required for acceptance of any research. In our study, healthcare-associated infections represented the most frequent used descriptor over four decades. Nowadays, the Council on Education for Public Health (CEPH) requires that concerning schools and programs of public health to be accredited, the relevant doctoral degree must fit at least one of five areas of basic public health knowledge: epidemiology, biostatistics, environmental health, social and behavioral sciences, and health policy and management.[21] By considering Global Burden of Disease as part of epidemiological and environmental health studies, we can conclude that Tunisian doctoral dissertations in PCM (Public health) fit these international recommendations.

Low level of methodological evidence

In our survey, original research predominated (92.4%). However, synthesis and pedagogic research (systematic review, bibliometrics, …) were rare. The most common clinical studies were prevalence and incidence studies (22.1%) and the most common population studies were descriptive studies (38%). Hence, typologies of studies were globally in the minimal level of Evidence-Based-Practice. These findings were comparable with the bibliometrics analyzing the PCM articles, indexed in the Medline database over a 40-year period (1975-2014), which indicated that 35% of them were cross-sectional studies.[13] As for all medical specialties in Tunisia, our findings were better than those found in the study of Ben Salem et al.[22] This study was conducted on 616 dissertations in Monastir has shown that 54% of dissertations were case-control studies and 20% were descriptive studies. In accordance with observations in many Arab countries,[14,23,24] the scientific research was characterized also with minimal Evidence-Based-Analysis.

In Norway, to improve undergraduate nurses' research skills, a collaborative library-faculty teaching intervention was established in 2012 over three years. This intervention has improved the research skills regarding Evidence-Based Medicine. There was an increase in employing most Evidence-Based-Practice tools and the justifications were connected to important evidence-based practice

Table 3 Typology of study designs of Medical Doctoral Dissertations in the field of Preventive and Community Medicine performed in Faculties of Medicine of Tunisia between 1980 and 2019, n (%).

Typology of Dissertations	Faculty of Medicine of Sousse			Faculty of Medicine of Tunis			Faculty of Medicine of Monastir			Total Faculties of Medicine of Tunisia		
	1980–1999 (n=46)	2000–2019 (n=198)	1980–2019 (n=244)	1980–1999 (n=105)	2000–2019 (n=91)	1980–2019 n=196	1980–1999 n=35	2000–2019 n=120	1980–2019 n=155	1980–1999 n=186	2000–2019 n=409	1980–2019 n=595
Original Research	41	182	223	99	87	186	35	118	153	175	387	562
	(89.1)	**(91.9)**	**(91.4)**	**(94.3)**	**(95.6)**	**(94.9)**	**(100.0)**	**(98.3)**	**(98.7)**	**(94.1)**	**(94.6)**	**(94.5)**
Clinical study	26	108	134	46	44	90	20	56	76	92	208	300
	(56.5)	**(54.5)**	**(54.9)**	**(43.8)**	**(48.4)**	**(45.9)**	**(57.1)**	**(46.7)**	**(49.0)**	**(49.5)**	**(50.9)**	**(50.4)**
Prevalence /incidence	14	48	62	14	22	36	9	25	34	37	95	132
	(30.4)	**(24.2)**	**(25.4)**	**(13.3)**	**(24.2)**	**(18.4)**	**(25.7)**	**(20.8)**	**(21.9)**	**(19.9)**	**(23.2)**	**(22.1)**
Evaluation of healthcare quality	7	55	62	21	15	34	7	25	32	35	95	130
	(15.2)	**(27.8)**	**(25.4)**	**(20.0)**	**(16.5)**	**(18.4)**	**(20.0)**	**(20.8)**	**(20.6)**	**(18.8)**	**(23.2)**	**(21.8)**
Economic study	3	-	3	6	4	10	3	5	8	12	9	21
	(6.5)		**(1.2)**	**(5.7)**	**(4.4)**	**(5.1)**	**(8.6)**	**(4.2)**	**(5.2)**	**(6.5)**	**(1.5)**	**(3.5)**
Etiological study	1	3	4	1	2	3	-	-	-	2	5	7
	(2.2)	**(1.5)**	**(1.6)**	**(0.9)**	**(2.2)**	**(1.5)**				**(1.1)**	**(1.2)**	**(1.2)**
Case series	-	1	1	4	2	6	-	-	-	4	3	7
		(0.5)	**(0.4)**	**(3.8)**	**(2.2)**	**(3.1)**				**(2.2)**	**(0.7)**	**(1.2)**
Therapeutic study	1	1	2	-	-	-	1	1	2	2	2	4
	(2.2)	**(0.5)**	**(0.8)**				**(2.9)**	**(0.8)**	**(1.3)**	**(1.1)**	**(0.5)**	**(0.6)**
Population study	14	74	88	53	43	96	15	60	75	82	177	259
	(30.4)	**(37.4)**	**(36.1)**	**(50.5)**	**(47.3)**	**(49.0)**	**(42.9)**	**(50.0)**	**(48.4)**	**(44.1)**	**(43.3)**	**(43.5)**
Descriptive study	14	62	76	46	37	83	14	53	67	74	152	226
	(30.4)	**(31.3)**	**(31.1)**	**(43.8)**	**(40.7)**	**(42.3)**	**(40.0)**	**(44.2)**	**(43.2)**	**(39.8)**	**(37.2)**	**(38.0)**
Evaluative study	-	9	9	3	2	5	-	3	3	3	14	17
		(4.5)	**(3.7)**	**(2.9)**	**(2.2)**	**(2.6)**		**(2.5)**	**(1.9)**	**(1.6)**	**(3.4)**	**(2.9)**
Analytic study	-	3	3	4	3	7	1	4	5	5	10	15
		(1.5)	**(1.2)**	**(3.8)**	**(2.3)**	**(3.6)**	**(2.9)**	**(4.2)**	**(3.2)**	**(2.7)**	**(2.4)**	**(2.5)**
Others	1	1	2	-	-	-	-	2	2	1	3	4
	(2.2)	**(0.5)**	**(0.8)**					**(1.7)**	**(1.3)**	**(0.5)**	**(0.7)**	**(0.6)**
Research synthesis	4	6	10	6	4	10	-	2	2	10	12	22
	(8.7)	**(3.0)**	**(4.1)**	**(5.7)**	**(4.4)**	**(5.1)**		**(1.7)**	**(1.3)**	**(5.4)**	**(2.9)**	**(3.7)**
Global evaluation	4	1	5	5	4	9	-	.	-	9	5	14
	(8.7)	**(0.5)**	**(2.0)**	**(4.8)**	**(4.4)**	**(4.6)**				**(4.8)**	**(1.2)**	**(2.4)**
Bibliometrics	-	5	5	-	-	-	-	1	1	-	6	6
		(2.5)	**(2.0)**					**(0.8)**	**(0.6)**		**(1.5)**	**(1.0)**
Systematic review	-	1	1	-	-	-	-	1	1	-	2	2
		(0.5)	**(0.4)**					**(0.8)**	**(0.6)**		**(0.5)**	**(0.3)**
Review	-	-	-	1	-	1	-	-	-	1	-	1
				(0.9)		**(0.5)**				**(0.5)**		**(0.2)**
Pedagogic Research	1	10	11	-	-	-	-	-	-	1	10	11
	(0.4)	**(4.1)**	**(4.5)**							**(0.5)**	**(2.4)**	**(1.8)**

Table 4 Editorial components of the Medical Doctoral Dissertations in the field of Preventive and Community Medicine at Tunisian faculties of medicine from 1980 to 2019 (Dissertations with abstracts), n (%).

	Faculty of Medicine of Sousse			Faculty of Medicine of Tunis			Faculty of Medicine of Monastir			Total Faculties of Medicine of Tunisia		
Quality of scientific writing	1980–1999 (n=34)	2000–2019 (n=198)	1980–2019 (n=232)	1980–1999 (n=42)	2000–2019 (n=91)	1980–2019 (n=133)	1980–1999 (n=0)	2000–2019 (n=110)	1980–2019 (n=110)	1980–1999 (n=76)	2000–2019 (n=399)	1980–2019 (n=475)
1. Title words were less than 15 (90 characters)	19 **(55.9)**	19 **(55.9)**	108 **(54.5)**	16 **(38.1)**	41 **(45.1)**	57 **(42.9)**	-	56 **(50.9)**	56 **(50.9)**	35 **(46.1)**	205 **(51.4)**	240 **(50.5)**
2. There were no abbreviations in the title	33 **(97.1)**	173 **(87.4)**	206 **(88.8)**	40 **(95.2)**	88 **(96.7)**	128 **(96.2)**	-	105 **(95.5)**	105 **(95.5)**	73 **(96.1)**	366 **(91.7)**	439 **(92.4)**
3. No mentions as (about a, study of, contribution of.)	28 **(82.4)**	150 **(75.8)**	178 **(76.7)**	16 **(38.1)**	45 **(49.5)**	61 **(45.9)**	-	92 **(83.6)**	92 **(83.6)**	44 **(57.9)**	287 **(71.9)**	331 **(69.7)**
4. The title reflected the content of the study	34 **(100.0)**	197 **(99.5)**	231 **(99.6)**	41 **(97.6)**	89 **(97.8)**	130 **(97.7)**	-	110 **(100.0)**	110 (100.0)	57 **(98.7)**	396 **(99.2)**	471 **(99.2)**
5. Presence of abstract	34 **(100.0)**	198 **(100.0)**	232 **(100.0)**	42 (100.0)	91 **(100.0)**	133 **(100)**	-	110 **(100.0)**	110 **(100.0)**	76 **(100.0)**	399 **(100.0)**	475 **(100.0)**
6. The abstract was structured (IMRaC)	21 **(61.8)**	175 **(88.4)**	196 **(84.5)**	32 **(76.2)**	88 **(96.7)**	120 **(90.2)**	-	97 **(88.2)**	97 **(88.2)**	53 **(69.7)**	360 **(90.2)**	413 **(86.9)**
7. The aim of the study was clarified	33 **(97.1)**	194 **(98.0)**	227 **(97.8)**	33 **(78.6)**	90 **(98.9)**	123 **(92.5)**	-	102 **(92.7)**	102 **(92.7)**	66 **(86.8)**	386 **(96.7)**	452 **(95.2)**
8. The type of the study was mentioned	19 **(55.9)**	184 **(92.9)**	203 **(87.5)**	15 **(35.7)**	71 **(78.0)**	86 **(64.7)**	-	97 **(88.2)**	97 **(88.2)**	34 **(44.7)**	352 **(88.2)**	386 **(81.3)**
9. The study population was presented	25 **(73.5)**	164 **(82.8)**	189 **(81.5)**	29 **(69.0)**	76 **(83.5)**	105 **(78.9)**	-	101 **(91.8)**	101 **(91.8)**	54 **(71.1)**	341 **(85.5)**	398 **(83.2)**
10. The Data collection source was presented	27 **(79.4)**	185 **(93.4)**	212 **(91.4)**	31 **(73.8)**	83 **(91.2)**	114 **(85.7)**	-	102 **(92.7)**	102 **(92.7)**	58 **(76.3)**	370 **(92.7)**	428 **(90.1)**
11. Main results were presented	32 **(94.1)**	189 **(95.5)**	221 **(95.3)**	41 **(97.6)**	89 **(97.8)**	130 **(97.7)**	-	110 **(100.0)**	110 **(100.0)**	73 **(96.1)**	388 **(97.2)**	461 **(97.1)**
12. Means were associated with standard deviations	4 **(11.8)**	56 **(28.3)**	60 **(25.9)**	-	26 **(28.6)**	26 **(19.5)**	-	36 **(32.7)**	36 **(32.7)**	4 **(5.3)**	118 **(29.6)**	122 **(25.7)**
13. Confidence Intervals were mentioned if sampling	-	32 **(16.2)**	32 **(13.8)**	1 **(2.4)**	12 **(13.2)**	13 **(9.8)**	-	19 **(17.3)**	19 **(17.3)**	1 **(1.3)**	63 **(15.8)**	64 **(13.5)**
14. Past tense verbs in the results section	4 **(11.8)**	126 **(63.6)**	130 **(56.0)**	5 **(11.9)**	66 **(72.5)**	71 **(53.4)**	-	76 **(69.1)**	76 **(69.1)**	9 **(11.8)**	268 **(67.2)**	277 **(58.3)**
15. The Conclusion was concordant with results	33 **(97.1)**	187 **(94.4)**	220 **(94.8)**	38 **(90.5)**	91 **(100.0)**	129 **(97.0)**	-	101 **(91.8)**	101 **(91.8)**	71 **(93.4)**	379 **(95.0)**	450 **(94.7)**
16. Absence of language mistakes	33 **(97.1)**	171 **(86.4)**	204 **(87.9)**	37 **(88.1)**	83 **(91.2)**	120 **(90.2)**	-	88 **(80.0)**	88 **(80.0)**	70 **(92.1)**	342 **(85.7)**	412 **(86.7)**
17. Sentences did not start with numbers	23 **(67.6)**	153 **(77.3)**	176 **(75.9)**	31 **(73.8)**	68 **(74.7)**	99 **(74.4)**	-	93 **(84.5)**	93 **(84.5)**	54 **(71.1)**	314 **(78.7)**	368 **(77.5)**

Quality of scientific writing	Faculty of Medicine of Sousse			Faculty of Medicine of Tunis			Faculty of Medicine of Monastir			Total Faculties of Medicine of Tunisia		
	1980–1999 (n=34)	2000–2019 (n=198)	1980–2019 (n=232)	1980–1999 (n=42)	2000–2019 (n=91)	1980–2019 (n=133)	1980–1999 (n=0)	2000–2019 (n=110)	1980–2019 (n=110)	1980–1999 (n=76)	2000–2019 (n=399)	1980–2019 (n=475)
18. Short sentences (Shorter than two lines)	7	51	58	8	21	29	-	23	23	15	95	110
	(20.6)	**(25.8)**	**(25.0)**	**(19.0)**	**(23.1)**	**(21.8)**		**(20.9)**	**(20.9)**	**(19.7)**	**(23.8)**	
19. There were no abbreviations in the abstract	20	95	115	29	51	80	-	33	33	49	179	228
	(58.8)	**(48.0)**	**(49.6)**	**(69.0)**	**(56.0)**	**(60.2)**		**(30.0)**	**(30.0)**	**(64.5)**	**(44.9)**	**(48.0)**
20. Keywords were Mesh words	6	52	58	20	51	71	-	38	38	26	141	167
	(17.6)	**(26.3)**	**(25.0)**	**(47.6)**	**(56.0)**	**(53.4)**		**(34.5)**	**(34.5)**	**(34.2)**	**(35.3)**	**(35.2)**

Table 5 Quality of scientific writing of Doctoral Dissertations in Preventive and Community Medicine in Faculties of Medicine of Tunisia from 1980 to 2019, n (%).

Quality of scientific writing	Faculty of Medicine of Sousse			Faculty of Medicine of Tunis			Faculty of Medicine of Monastir			Total Faculties of Medicine of Tunisia		
	1980-1999 (n=46)	2000-2019 (n=198)	1980-2019 (n=244)	1980-1999 (n=105)	2000-2019 (n=91)	1980 -2019 (n=196)	1980- 1999 (n=35)	2000 -2019 (n=120)	1980 -2019 (n=155)	1980- 1999 (n=186)	2000 -2019 (n=409)	1980 -2019 (N=595)
Satisfactory Quality	5	101	106	3	47	50	-	50	50	8	198	206
(Total score > 75%)	**(10.9)**	**(51.0)**	**(43.4)**	**(2.9)**	**(51.6)**	**(25.5)**		**(41.7)**	**(32.3)**	**(4.3)**	**(48.5)**	**(34.6)**
Not Satisfactory Quality	41	97	138	102	44	146	35	70	105	178	211	389
(Without abstract or score < 75%)	**(89.1)**	**(49.0)**	**(56.6)**	**(97.1)**	**(48.4)**	**(74.4)**	**(100.0)**	**(58.3)**	**(67.7)**	**(95.7)**	**(51.5)**	**(65.4)**
Without Abstract	12	-	12	63	-	63	35	10	45	110	10	120
	(26.1)		**(4.9)**	**(60.0)**		**(32.1)**	**(100.0)**	**(8.3)**	**(29.0)**	**(59.1)**	**(2.4)**	**(20.2)**
Score < 75%	29	97	126	39	44	83	-	60	60	68	201	269
	(63.0)	**(49.0)**	**(51.6)**	**(37.1)**	**(48.4)**	**(42.3)**		**(50.0)**	**(38.7)**	**(36.6)**	**(49.1)**	**(45.2)**

principles.[11] In this study the gap between PCM methodologies and the Evidence-Based Practice could be explained by the ease and speed of performing descriptive studies.

Unsatisfactory quality of scientific writing

The quality of scientific writing of doctoral dissertations in PCM was satisfactory in 34.6% globally. The best quality of scientific writing was found during the second period (2000-2019) with 43.4% and in the faculty of medicine of Sousse (48.5%) (table 5). The least respected items in scientific writing were presenting Confidence Intervals, short sentences and presenting means with Standard Deviations. A similar study was conducted at the faculty of dental medicine of Monastir in Tunisia between 2014 and 2018 and it has shown that the quality of scientific writing score was 12.1±2.4 / 20.[25] According to this bibliometrics, the most respected items were the absence of abbreviations in the title and in the summary, the absence of language mistakes and a clarified objective. However, the least respected items were the presence of long sentences, the absence of confidence intervals in case of sampling, and the keywords were not mesh words.

For many scientists, writing clear and concise manuscripts is a major hurdle to their professional success. This overarching challenge can be split into two issues: writing initial drafts and performing an effective revision. Both require considerable investments of time and energy.[26] Improving the quality of scientific writing was the objective of the committee of the medical education association of the Netherlands in 2017. This committee has proposed seven evaluation criteria for the best Ph.D. dissertation which were: size, breadth of research, skills exhibited, coherence of studies, relevance to field, validity, style, communicative power and ethics, and impact of the work.[27] These criteria may not only assist similar committees but also provide criteria of excellence for future doctoral work in health professions education. Furthermore, a companion dissertation was developed recently (two or more doctoral students who share mutual research interests). In addition to that, in Europe, in 2016, a study was conducted about the acceptance of systematic reviews for Ph.D. dissertations in biomedical doctoral European programs. Results have shown that in 47% of programs, systematic reviews were an acceptable study design for Ph.D. dissertations with raising awareness about the importance of systematic reviews as a research methodology for a doctoral thesis.[28] Thus, for many scientists, the choice of the right project, then writing clear and concise represents a major challenge to professional success. This overarching challenge requires considerable investments of time and energy associated with a strict respect of simple rules for concise scientific research.[12,29]

Finally, here are provided some suggestions as to doctoral dissertations writing strategies. Initially, the doctoral dissertations must fit the adequate areas of basic public health which follows the epidemiological transition, and the evolution of the population's health needs. Secondly, mentors must face challenges of filling a gap in the existing literature, then, they must determine sufficiently the nature of the study that will be needed to fill it. In addition to that, the methodology of research should be characterized by a strength Evidence-Based Practice analysis (analytic studies, experimental studies, systematic reviews...).

Moreover, there is a need for postgraduate students to better understand the importance of doctoral dissertations as a scientific project and to discover the reasons to do a research project during their postgraduate training (learning the basics of research techniques, including epidemiology and biostatistics; understanding how to appraise the literature to address questions; develop some expertise and a deeper understanding of a topic; giving the student tools to critically and thoughtfully appraise problems they are faced with every day; learn to communicate scientific research in verbal presentations and written forms…).[30] In addition, faculties should organize enriching sessions on rules and recommendations of conducting research, communicating results and simple rules for concise scientific writing. These sessions must be compulsory for students. This initiative is applied in some faculties of medicine, hoping that it would be applied in the three other faculties of medicine of Tunisia.

To sum up, the findings of the current study confirmed the existence of some limitations in Tunisian doctoral dissertations in PCM. New directions for reducing and coping with these insufficiencies are recommended. Performing a highly Evidence-Based and well-structured dissertation would only be rewarding, both professionally and personally.

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Ethical considerations

The study protocol was submitted to the ethics committee for medical research studies of the faculty of medicine of Sousse, which gave its approval on July 27, 2020. The ethical approval was referenced: Ref CEFMS 53/2020.

Patient/participant informed consent does not apply as we have not collected data from individuals. we processed data from theses already defended and archived in the libraries of the faculties of medicine of Tunisia.

Information

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Declaration of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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