

ORIGINAL ARTICLE

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Evaluation of theses in the field of forensic medicine in Turkey **Semih Petekkaya¹**,  **Ismail Altin²**¹*Onsekiz Mart University Department of Forensic Medicine, Canakkale, Türkiye*²*Justice Ministry, Council of Forensic Medicine Sanliurfa, Türkiye*

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**Abstract**

The aim of this study was to evaluate and compare the scientific efficacy of medical specialism theses prepared in the Forensic Medicine Departments of universities in Turkey, to examine how visible these are to the scientific community, and to determine the links between an academic career and thesis publication. In this retrospective cohort study, a total of 383 forensic medicine specialism theses were evaluated from The National Thesis Centre internet address between 1983 and 2020. The most common research subject was clinical forensic medicine and trauma with 58 (15.1%) theses. 307 (80.2%) of theses were published. While 307 (80.2%) of the theses were not presented as a publication in a scientific journal, 76 (19.8%) were converted to a scientific publication, of which 75 (98.6%) were published in Google Scholar, 39 (51.3%) in SCI-E, 31 (40.8%) in PubMed, and 2 (2.6%) in SCI journals. The provision of courses including the process of thesis writing, applying for ethics committee approval, statistical analysis and evaluation, the rules of writing a scientific article, and the selection of a scientific journal, will encourage young researchers on the subject of scientific publication and will play an important role in the improvement of the quality of publications.

Keywords: Forensic medicine, thesis, research, education**Introduction**

Universities are the higher education and research institutions that provide the scientific and technical development of societies. Several different faculties come under the roof of such institutions. Medical faculties have an important role in the formation of health-related scientific data, pre and postgraduate student education, and in the presentation of routine healthcare services [1-3]. In the preparation of the medical doctors and specialists of the future, medical education before graduation usually prepares students for medical practice, while postgraduate education prepares them for the scientific World [4].

In Turkey, the “Medical Specialisation Board” is authorised to supervise pre and postgraduate medical education and ensure

certain standards. In accordance with the Medical Specialisation Board decisions and legal requirements, a student of a medical specialism must prepare a thesis to be able to take the final examination in the branch speciality. A thesis subject and thesis advisor are determined for the student in the first half of the specialism training. The thesis work is checked quarterly by the advisor. The thesis is delivered to the program manager 3 months before the end of the speciality training period at the latest, for presentation to the jury, formed of at least 3 primary members and 2 substitutes, with at least one of the primary members from outside the institution. Within one month, the jury examines the thesis and the student’s defence and then informs the student and program manager in writing of the result and justifications. Students who are successful in the thesis presentation and the speciality examination then have the right to take the professional title of medical specialist.

A thesis is a document which presents research based on the knowledge and experience accumulated through the years of education at university [5]. Each year, students spend time and money preparing and writing theses [6]. A medical speciality student preparing a thesis is expected to be able to form a

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hypothesis, access scientific resources, collect data according to the hypothesis, analyze the data statistically, compare the results with scientific sources and be able to comment on these, and to present the scientific data obtained. The first aim in the preparation of a thesis is to acquire the methodology of scientific thought, learn the technique of writing a scientific article, and produce new information which will contribute to literature [4,7].

The next logical step in the research process is the publication of the results. This can be achieved through presentation at a scientific meeting or publication in a peer-reviewed journal. Presentations provide new information rapidly to the conference participants. However, these data are not available to the whole scientific community unless published in a reputable, scientific journal with extensive distribution. Moreover, publication in a peer-reviewed journal is the best test to evaluate the quality of the research. A reviewed publication derived from a thesis also informs the scientific community about the integration of medical education and research. Publication in a peer-reviewed journal is an indicator of the scientific value and acceptability of the thesis in the international scientific community [3,5,7,8].

According to the Medical and Dentistry Specialist Education Management in Turkey, despite the requirement to prepare a thesis to be a forensic medical specialist, it is not necessary for the thesis to be published in a scientific journal [1]. Publication of the thesis in a scientific journal increases the value and accessibility of the thesis [6]. The conditions to apply for associate professorship include an article published in a national or international peer-reviewed journal, presentation at a national or international symposium or congress, and an oral presentation that contributes to the science in the field in which the full text was published [9]. For a thesis to be accepted by the scientific academic community, the thesis must be presented as an article or in oral form.

The theses prepared in Turkey for competence in the arts, medical auxiliary branch specialisms, master's degree, medical and dentistry specialisms and doctorates are uploaded online to a database under the name of National Thesis Centre. Those who are successful in the thesis examination transfer their thesis to this system on the internet which has free access by stating the access status of the whole text [10]. To date, different studies have been conducted to analyze the bibliometric characteristics of theses in different medical specialist fields. However, no study could be found which has analyzed the medical specialist thesis profile in the field of forensic medicine. The aim of this study was to evaluate and compare the scientific efficacy of medical specialism theses prepared in the Forensic Medicine Departments of universities in Turkey, to examine how visible these are to the scientific community, and to determine the links between academic career and thesis publication.

Material and Methods

In this retrospective cohort study, the keyword of "forensic medicine" was used in the search of the departments of the Higher Education Board Directorate National Thesis Centre internet address. A total of 383 forensic medicine specialism theses were identified, which had full access and had been made in the field of forensic medicine between 1983 and 2020 in the Forensic Medicine Departments in university medical faculties in Turkey. All 383 were included in the study for evaluation.

The theses were examined in respect of the year of printing, the gender of the researcher, the access status of the full text of the thesis, the academic title of the thesis supervisor, the type of research, whether or not the hypothesis was realized, the subject of the thesis, the research method used, the publication status of the thesis, the database of published theses, the time interval after which it was published, the order of the thesis student in the published article, and academic career after the thesis. The academic title of the thesis supervisor was categorised as doctor faculty member, associate professor or professor doctor, as the three academic titles accepted by the Higher Education Board Directorate in Turkey. The type of research was defined as descriptive research (case series, correlational studies), analytical research (cross-sectional research, case-control studies, cohort studies), experimental research (human, animal), and reviews. The research methods were evaluated as interview-questionnaire-scales, laboratory tests, radiological imaging methods, file scanning, and other methods.

The subject of the thesis was defined under 26 main headings as trauma-related clinical forensic medicine, age and gender assignment, forensic psychiatry, sexual assault and abuse, autopsy, autopsy and trauma, identity assignment, clinical forensic medicine poisoning, autopsy and poisoning, medical malpractice, firearms injuries, autopsy and sudden death, postmortem interval specification, experimental animals in forensic medicine practice, autopsy and hanging, autopsy and atherosclerosis, autopsy and drowning, criminal adolescent behaviour, abuse and neglect, paediatric autopsy, forensic genetics, medical law, handwriting and signature analyses, and autopsies of the homeless.

Google, Google Scholar, and PubMed databases were scanned for publications obtained from theses. If a study had been published, evaluation was made of whether or not the journal was indexed as SCI (Science Citation Index) or SCI-E (SCI-Expanded) by scanning the current status of the journal on the Thomson Reuters lists. Searches were made by matching the author's name using the first name and surname of the author, different combinations for authors with more than one first name, and the whole title of the thesis or the keywords in the thesis. If the title or abstract content were consistent with the features of the study, the thesis was accepted as published. When evaluating the publication status, the last two years were not included to be able to consider the component of sufficient time for publication.

Academic career was defined in this study as employed on the staff of a university as doctor faculty member, associate professor faculty member, or professor faculty member. Information on this subject was obtained by searching the databases of the Republic of Turkey Ministry of Health and Higher Education Board.

Data obtained in the study were analyzed statistically using SPSS vn. 22.0 software. Descriptive statistics were expressed as number and percentage. Measurement data were compared by Mann Whitney-U and Chi square test. A value of $P < 0.05$ was accepted as statistically significant.

Ethical permission was not obtained because the study was conducted on publicly available applications.

Results

A total of 383 forensic medicine specialism theses with open access were identified as written between 1983 and 2020 in the

Forensic Medicine Departments of university medical faculties in Turkey. The researchers were 297 (77.5%) males and 86 (22.5%) females. The full text of the thesis could be accessed in the system in 319 (83.3%) cases and there was not full access for 64 (16.7%). The distribution of thesis supervisors according to academic title was 94 (24.5%) doctor faculty members, 97 (25.3%) associate professor doctors, and 180 (47%) professors, and the academic title was not stated in 12 (3.1%) cases. The types of research are shown in Table 1.

Table 1. Research types

	Number (n)	Percentage (%)
Descriptive-Case series	172	44.9
Cohort-prospective	98	25.6
Cohort-retrospective	7	1.8
Experimental – animal	32	8.4
Experimental	68	17.8
Review	6	1.6
Total	383	100.0

The hypothesis was realized in 357 (93.2%) studies and not realized in 26 (6.8%). The research subjects are shown in Table 2 and the research methods in Table 3. No statistically significant difference was determined between the research subjects when evaluated according to publication status.

Table 2. Research Subjects

	Number (n)	Percentage (%)
Clinical forensic medicine-trauma	58	15.1
Age and gender assignment	33	8.6
Autopsy	26	6.8
Forensic psychiatry	25	6.5
Sexual assault-abuse	24	6.3
Autopsy-trauma	22	5.7
Clinical forensic medicine - poisoning	21	5.5
Identification	20	5.2
Firearms	14	3.7
Medical malpractice	13	3.4
Autopsy-poisoning	12	3.1
Autopsy-sudden death	11	2.9
Postmortem interval specification	10	2.6
The use of experimental animals in forensic medicine practice	7	1.8
Autopsy-hanging	6	1.6
Autopsy -atherosclerosis	6	1.6
Autopsy drowning	6	1.6
Criminal adolescent behaviour	5	1.3
Abuse-neglect	5	1.3
Suicide	5	1.3
Autopsy -paediatric age group	4	1
Forensic genetics	4	1
Medical law	4	1
Handwriting and signature analyses	3	0.8
Autopsy – homeless deaths	3	0.8
Autopsy -asphyxia	3	0.8
Other	33	8.6
Total	383	100

Table 3. Research Methods

	Number (n)	Percentage (%)
Record scanning	154	40.2
Laboratory examinations	101	26.4
Interview, Questionnaire, Scales	61	15.9
Other	38	9.9
Imaging methods	29	7.6
Total	383	100

While 307 (80.2%) of the theses were not presented as a publication in a scientific journal, 76 (19.8%) were converted to a scientific publication, of which 75 (98.6%) were published in Google Scholar, 39 (51.3%) in SCI-E, 31 (40.8%) in PubMed, and 2 (2.6%) in SCI journals (Table 9). The conversion of the thesis to publication occurred in the time range of 1 year after finishing specialist education to 10 years after, with the mean time determined as 2.9 years. The distribution of theses according to year of publication is shown in Table 4.

Table 4. Years of Publication

	Number (n)	Percentage (%)
Up to 2000	2	2.6
2001-2005	7	9.2
2006-2010	16	21.1
2011-2015	21	27.6
2016-2020	30	39.5
Total	76	100

When the thesis was converted to an article for publication, the thesis author was named as the first author of the article in 62 (81.6%) cases and was not stated as the first author of the article in 14 (18.4%) cases (Table 10). When the academic careers of the specialist students were examined, 89 (23.2%) were working in the forensic medicine department of a university, 211 (55.1%) were working in forensic medicine units not in universities, and 83 (21.7%) who had graduated in the last 2 years were undertaking compulsory service in other forensic medicine units.

The distribution of the theses according to the year in which they were written and the publication rate is shown in Table 5. A statistically significant increase was determined in the number of published theses according to the years ($P \leq 0.000$). This difference was seen to originate from the conversion of theses to published articles at a higher rate than expected after 2000.

Table 5. The years in which theses were written and the rates of publication

	Distribution of theses		Distribution of published articles	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Up to 2000	29	7.6	2	2.6
2001-2005	44	11.5	7	9.2
2006-2010	61	15.9	16	21.1
2011-2015	83	21.7	21	27.6
2016-2020	166	43.3	30	39.5
Total	383	100	76	100

The rates of conversion of the theses to published articles according to the type of research are shown in Table 6. A statistically significant difference was determined in the analysis ($P < 0.001$), which was found to be due to the higher rate of conversion to published articles of animal experiments and experimental research compared to the other types.

Table 6. The rate of conversion of theses to published articles according to the type of research

	Not published	Published	Total
Descriptive-Case series	24-(6.35)	148-(38.6%)	172-(44.9%)
Cohort-prospective-retrospective	18-(4.7%)	87-(22.7%)	98- (27.4%)
Experimental – animal	12-(3.1%)	20-(5.2%)	32- (8.4%)
Experimental	22-(5.7%)	46-(12%)	68-(17.8%)
Review	0	6-(1.6%)	6-(1.6%)
Total	76-(19.8%)	307-(80.2%)	383-(100%)

The research method and rates of thesis publication are shown in Table 7. The rate of conversion to published article was determined to be significantly higher for theses where record scanning, laboratory examinations and imaging methods were used ($P<0.001$).

Table 7. Research methods and thesis-publication rates

	Not published	Published	Total
Record scanning	134, 35%	20, 5.2%	154, 40.2%
Laboratory examinations	67, 17.5%	34, 8.9%	101, 26.4%
Interview, Questionnaire, Scales	52, 13.6%	9, 2.3%	61, 15.9%
Other	33, 8.6%	5, 1.3%	38, 9.9%
Imaging methods	21, 5.5%	8, 2.1%	29- 7.6%
Total	307, 80.2%	76, 19.8%	383- 100%

The academic title and thesis publication rates are presented in Table 8. A statistically significant difference was determined between the groups ($P<0.05$), and the difference was determined to be due to a higher rate of conversion of theses to published articles by associate professors and doctor faculty members despite the lower numbers.

Table 8. Academic title of the thesis supervisor and thesis-publication rates

	Not published	Published	Total
Dr. Faculty member	74, 19.3%	20, 5.2%	94, 24.5%
Associate professor	70, 18.3%	27, 7%	97, 25.3%
Professor	151, 39.4%	29, 7.6%	180, 47%
Not stated	12, 3.1%	0, 0%	12, 3.1%
Total	307, 80.2%	76, 19.8%	383-100%

No significant difference was determined between the genders in respect of thesis publication. A statistically significant difference was determined between the rates of thesis publication according to academic career ($P\leq 0.001$), which was due to the number of theses converted to publication by faculty members.

When the thesis was published, the student who was the author of the thesis was named as the first author in 62 (81.6%) cases and was not the first named author in 14 (18.4%) cases. No statistically significant difference was determined between being named or not as the first author of the published thesis according to academic career.

Table 9. Databases where articles were published

Database	Number (n)	Percentage (%)	Rate of total theses
Google Scholar	75	98.7	19.5%
PubMed	31	40.8	8%
SCI-E	39	51.3	10.1%
SCI	2	2.6	0.5%

Table 10. Academic Career- Rate of thesis publication

Academic Career	Not published	Published
Yes	52	37
No	175	36
Not known as yet	79	3
Total	306	76

Discussion

The rates of conversion of medical theses to published articles

have been reported as 17% in France, 17.6% in Peru, and as 24% for the years 1990-1999 in two medical faculties in Croatia. [4,5,8] In a general study that examined 22.625 medical theses in Turkey between 1980 and 2005, the rate of conversion to published article in SCI-E journals was found to be 6.2%. Of all the theses written between 1980 and 2000, 684 (3%) were converted to published articles, and this number was 713 (3.2%) for the theses between 2001 and 2005. In the same study, the publication rate of theses in the field of forensic medicine was determined to be 3%. [11]. Another study examined 1508 theses written between 1974 and 2014 in the field of Orthopaedics and Traumatology, and reported the conversion rate to published articles to be 14.9%, 36 (2%) in journals indexed in the Pubmed database, and 188 (12.4%) in SCI and SCI-E journals (6). Another study reported that 14.4% of General Surgery theses were published in SCI and SCI-E indexed journals [2]. In the fields of Infectious Diseases and Clinical Microbiology, the rate of thesis conversion to published article has been stated to be 11.3% [12]. Of 579 theses in Emergency Medicine between 1998 and 2013, 157 (27.1%) were published, of which 68 (14.9%) were in SCI and SCI-E indexed journals [13].

In the current study, 76 (19.8%) theses were converted to published scientific articles. The rate of thesis conversion to publication in 2005 in the field of Forensic Medicine was 11.8% which was determined to be a higher rate than that of all medical theses in Turkey (6.2%). This rate of thesis conversion to publication was similar to the rates in the studies from France and Peru. In the current study there was determined to have been an increase in the conversion rates in recent years. This is thought to be due to thesis publication or oral presentation being among the criteria for associate professorship playing a role in the academic incentives for converting theses for publication. However, it is noticeable that the rate of conversion to published articles is lower than that of theses in the field of emergency medicine.

In a study of the distribution of emergency medicine theses according to the type of research, 448 (77.4%) were observational and 121 (20.9%) were experimental studies. The studies published in SCI and SCI-E indexed journals comprised analytical and animal studies [13]. Yaman et al evaluated theses written in the field of family medicine in the period 1981-2008, and reported that 67.1% of the theses were observational, 7.9% were experimental, and 25% were retrospective studies [14]. In the current study, the research that used cross-sectional and retrospective research methods comprised 44.9% of all the studies. Experimental animal studies were determined at the rate of 8.4% and experimental studies at 17.8%. The proportionally higher rate of observational studies can be attributed to researchers tending to these thesis topics when there is a short time to enter the medical speciality examination and that there is no pressure of financial resources in the thesis management. While the rate of conversion to publication was 6.3% for cross-sectional and retrospective studies, the rate for prospective studies (experimental and cohort) which have higher scientific evidence value was 13.5%. There was seen to be a significant difference between the types of research. Moreover, in the current study which included the last 10 years, there was a noticeable increase in the rate of experimental studies. As the conducting of experimental studies and their publication requires more hours of work, they are more valuable. These types of studies are associated with the increase in the number of universities in recent years and the proportion of financial support allocated to

university research. As seen in the field of emergency medicine, when preparing the thesis it should be considered that the selection of a type of research which has a higher scientific evidence value could play an effective role in the thesis being published.

Although there has been an increase in the rates of theses published as original articles, the majority of thesis studies are low level research. Experimental studies have a rapid rate of conversion to publication. Medical specialism students should be encouraged by faculty members to conduct experimental studies in the second year of the education period. The presented research has shown that experimental studies have significantly higher rates of publication. The reason for this difference is that clinical studies require more effort, it takes longer to obtain results, the longer follow-up period facilitates patient loss, and experimental studies have the potential of providing original information with a higher potential for scientific publication. Although prospective randomised studies are the most valuable studies, these factors have created a tendency for residents to produce experimental theses. The increase in recent years in the number of clinical studies is thought to be related to developments in hospital information processing systems and computer technology, which has made it easier to access data.

In a study which examined theses written between 1978 and 2010 in the field of family medicine, 85.5% of the student authors of the thesis were named as the first author of the published article [15]. In the current study, 62 (81.6%) of the student authors of the thesis were named as the first author on publication. It is important in academic studies that young researchers are named as the first author to be able to see a return for their efforts made and to encourage them to undertake scientific research.

With the condition of thesis publication as a criteria for applying for associate professorship, it also became a condition for application as a university faculty member. The conversion of theses to articles published in journals requires positive discrimination to increase the motivation of young researchers.

Of the forensic medicine doctorate theses in Spain between 2000 and 2009, 38.5% were on the subject of forensic pathology, 13.9% forensic toxicology, 13.97% forensic psychiatry, 13.41% clinical forensic medicine, and 7.26% assessment of bodily harm and other subjects [16]. In the current study, 15.1% of the theses were clinical forensic medicine-trauma, 8.6% age and gender assignment, 6.8% autopsy, and 6.5% forensic psychiatry and other subjects. There was a lower rate of studies in the area of forensic pathology compared to Spain, which was attributed to the preference of the legal authorities in Turkey for the Forensic Medicine Institute to perform forensic autopsy procedures and that there are no learning opportunities outside of the institutional centre.

Similar to a study by Erim et al, it was seen in the current study that the conversion of theses to published articles could play a determinant role in the faculty member title and academic career plan of medical specialism students [17]. Almost half of the thesis advisors were professor faculty members. However, when the rates of thesis conversion to published article were examined, there was significantly higher rate of those supervised by associate professor and doctor faculty member academicians. As academics with the title of associate professor and doctor faculty member have a greater need for scientific publications to gain academic promotion, the motivation of these faculty members is higher. Conversion of a

thesis to a published article makes a significant contribution to the future career plan of a medical specialism student.

Conclusion

The rate of conversion of theses to published articles in the field of Forensic Medicine has increased over the years, and the increase in the last 15 years in particular has been significant. As can be understood from the number of theses, an increase has also been seen in these years in the rate of students taken onto the staff as medical specialists from the medical specialism examination [6]. However, when it is considered that in addition to the great effort spent preparing a thesis, there is also financial outlay, and 4 years in education spent learning the rules of scientific methodology, the conversion rate is not at a sufficient level. The reasons for this low level include the increasing workload of medical faculties in providing routine healthcare services, the rapid increase in the number of undergraduates, low motivation of faculty members, insufficient time allocated for the development of academic skills, difficulties experienced in the process of thesis preparation, lack of foreign language knowledge, absence of a plan for an academic life as the financial income of medical specialism students is low, and that, as in France, only defence of the thesis is seen as sufficient for the thesis to be counted as successful [7,8,13,16,17].

A mentoring program designed to develop scientific skills has a positive effect on publication rates [16]. The provision of courses including the process of thesis writing, applying for ethics committee approval, statistical analysis and evaluation, the rules of writing a scientific article, and the selection of a scientific journal, will encourage young researchers on the subject of scientific publication and will play an important role in the improvement of the quality of publications.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical approval

Ethical permission was not obtained because the study was conducted on publicly available applications.

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