



# BIBLIOMETRIC ANALYSIS OF PHD, RESIDENCY DISSERTATIONS AND MASTER'S THESES IN PUBLIC HEALTH DEPARTMENTS IN TÜRKİYE BETWEEN 1970-2022

1970-2022 yılları arasında Türkiye'de halk sağlığı ana bilim dallarında yapılan doktora, tıpta uzmanlık ve yüksek lisans tezlerinin bibliyometrik analizi

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## Abstract

It was aimed to evaluate all theses conducted in public health departments between 1970 and 2022 in Türkiye. All public health theses (n=2623) indexed in Türkiye's Council of Higher Education Thesis Center were included. Each thesis was multi-tagged with subtopics. Trends in the field over five decades were examined. The most frequently studied subtopics are occupational safety (n=386, 10.63%), non-communicable diseases (n=373, 10.28%), and health promotion (n=339, 9.34%). the least ones are travel health (n=3, 0.08%), public health ethics (n=6, 0.17%), and health law (n=9, 0.25%). This study proposes an interactive scientific subtopic map based on conducted theses in the public health field in Türkiye. There is a need for a balanced distribution of our scientific energy so that critical areas in public health are not neglected.

**Keywords:** Public health, knowledge discovery, dissertation, bibliometric analysis, metascience.

## Özet

Türkiye'de 1970-2022 yılları arasında halk sağlığı bölümlerinde yapılan tüm tezleri değerlendirilmesi amaçlandı. Yükseköğretim Kurulu Tez Merkezi'nde indekslenen tüm halk sağlığı tezleri (n=2623) dahil edildi. Her tez, alt konularla çoklu etiketlendi. Elli yılı aşkın süredir bu alandaki eğilimler incelendi. En sık çalışılan alt konular iş güvenliği (n=386, %10,63), bulaşıcı olmayan hastalıklar (n=373, %10,28) ve sağlığın geliştirilmesi (n=339, %9,34) olmuştur. En az olanlar ise seyahat sağlığı (n=3, %0,08), kamu sağlığı etiği (n=6, %0,17) ve sağlık hukuku (n=9, %0,25) olmuştur. Bu çalışma, Türkiye'de halk sağlığı alanında yapılmış tezlere dayalı olarak interaktif bir bilimsel alt konu haritası önermektedir. Halk sağlığında kritik alanların ihmal edilmemesi için bilimsel enerjimizin dengeli bir şekilde dağıtılmasına ihtiyaç vardır.

**Anahtar kelimeler:** Halk sağlığı, bilgi keşfi, tez, bibliyometrik analiz, metabilim.

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## Introduction

Public health is "the science and art of preventing diseases, prolonging life, promoting physical health and efficiency, improving the quality of life, and organising efforts to prevent diseases through societal endeavours that aim to make the environment conducive to health, control communicable diseases, educate individuals according to principles of personal hygiene, and provide necessary health services for early diagnosis and preventive treatment to ensure a sufficient standard of living for every member of the community" (1). Public health professionals have worked on various topics related to community health in the past, and these topics have had different trends according to the conditions of the time. As a result of epidemiological changes and developments worldwide, some issues in Türkiye have lost their relevance over the years, while others have gained more attention and become research subjects (2). The changes in the fundamental topics that arise according to the necessities of the time can be observed in reference works in the field. Due to this ongoing change, there are no sharp boundaries among the research topics in public health (3-7). One of the most significant indicators of this change is the temporal distribution of scientific theses in the field. Public health professionals carry out their academic studies through residency, PhD, and master's programs in medicine. The public health residency programme in Türkiye started in 1958 at Refik Saydam Hıfzısıhha School, followed by Hacettepe University in 1965 and Atatürk University in 1967. Therefore, academic theses have rapidly increased since the 1970s (8).

Postgraduate education in public health provides students with basic knowledge, competent skills, and experiential experiences, and prepares them to become professional public health practitioners (9). According to Zwanikken et al., postgraduate theses and dissertations in the field of public health not only open the door to new scientific discoveries in current and needed research topics but also contribute to the reporting of health needs for the population and region, equal access to quality services, and provide support to relevant researchers, policymakers, and service providers. On the one hand, these theses and dissertations are historical

records showing how the agenda of public health has changed over time, serving as a logbook of public health's course. Therefore, the bibliometric analysis of the theses and dissertations produced in the field provides a valuable map to understand the direction of the field's progress, especially regarding the temporal distribution of topics (10).

Bibliometric analysis involves using statistical analysis methods encompassing various laws and techniques to examine the characteristics of academic publications (11). It is used to study the aspects and process of change in academic work in different scientific disciplines or sub-disciplines within the same field (12). The first bibliometric study was conducted in 1919 by Alan and Cole, while the term "bibliometrics" was first used by Alan Pritchard in 1969. Bibliographic data, such as authors, publishers, publication year, publication type, and citations, are used as the data source for bibliometric analysis (13). These studies allow for the analysis of trends in a specific field, identifying the influence of individuals and research areas, and observing changing and evolving research areas (14). Therefore, successful bibliometric studies provide a general overview of the relevant field, identify existing gaps, and guide future researchers to conduct original studies in the field. Nature, one of the leading scientific journals, effectively mapped its accumulation and shared it with the scientific community, making the boundaries of our knowledge visible.

While there are existing studies evaluating research production in different regions of the world in various scientific disciplines, it has been determined that there is limited data available for the bibliometric evaluation of research conducted in the field of public health (15). The number of thesis and dissertation studies conducted in Türkiye's public health field has increased parallel to the increase in institutions and researchers over the years. Therefore, bibliometric studies conducted in the field of public health are becoming increasingly important (16-18). In a study, public health residency dissertations, master's theses, and doctoral dissertations conducted in Türkiye between 2009 and 2019 were analysed using bibliometric analysis. However, this study, which evaluated only 11 years, does not cover all the studies conducted in the field of public health at the national thesis centre.

Additionally, theses that include multiple topics were evaluated by reducing them to a single topic (16).

Understanding the dynamics and trends of research in the field of public health, as well as identifying more productive research themes and how they have developed, is an urgent international need to assess the current education status (19). It has been proven that the bibliometric method effectively evaluates academic output and objectively reflects research topics (20). Due to the limitations of bibliometric analyses conducted in Türkiye in the field of public

health, we aimed a more comprehensive study to evaluate PhD, residency dissertations and master's theses conducted in public health departments between 1970 and 2022. The main topics of public health were determined by examining reference works in the field, which were used to code the thesis topics. Thus, the changes in public health topics in Türkiye over the past five decades were comprehensively presented, and the interactions among these areas were examined in the study. The study also generated interactive content for further research and published it online.

## Material and Method

### **Study Design and Data Scope**

This study is a cross-sectional descriptive research. The research scope encompasses all master's theses, doctoral (PhD) and medical residency (TU) dissertations (n=2623) conducted in public health departments of medical faculties between the years 1970 and 2022, indexed in the Council of Higher Education (CoHE) thesis center. Although indexed under the topic of public health, theses conducted outside the departments of public health (n=1799) and theses not indexed on the CoHE Thesis Center website are excluded from the scope.

### **Data Collection and Preparation**

All postgraduate theses conducted in Türkiye are publicly available as open data in the Council of Higher Education (YÖK) Thesis Center system. The metadata of the included theses (thesis number, title, author, advisor, year, thesis type, page count, university) have been utilised. Therefore, ethical approval is not required for this study.

In addition to the existing metadata of the theses, the specific subtopics within the field of public health that the researchers have identified each thesis focused on. To achieve this, the distribution of subtopics in fundamental public health reference works

was examined by the researchers, resulting in the creation of a list of core subtopics in public health (n=33) through this preliminary study (3, 4, 6, 7). These study topics were categorised into three clusters: core study areas within the field (e.g., Immunization), methodological issues (e.g., Health Promotion), and current topics (e.g., Addiction).

During the pilot phase of the study, it was observed that there were theses focused on a single subtopic as well as theses encompassing multiple topics. Therefore, the 2623 theses were tagged by the researchers with at least one and up to three subject labels. A total of 3630 subject labels were generated.

### **Data Analysis**

Google Sheets was used to label the theses and analyze the data. In data analysis, total, minimum, maximum, and mean values, percentages, common subject analysis, frequency tables, and interactive visualisations based on these tables were applied. Interactive visuals were created using the Florish program. This allowed the mapping of public health thesis studies conducted in Türkiye from 1970 to 2022. Due to the large size of the frequency tables obtained in the analyses, the prominent findings are presented in the article.

## Results

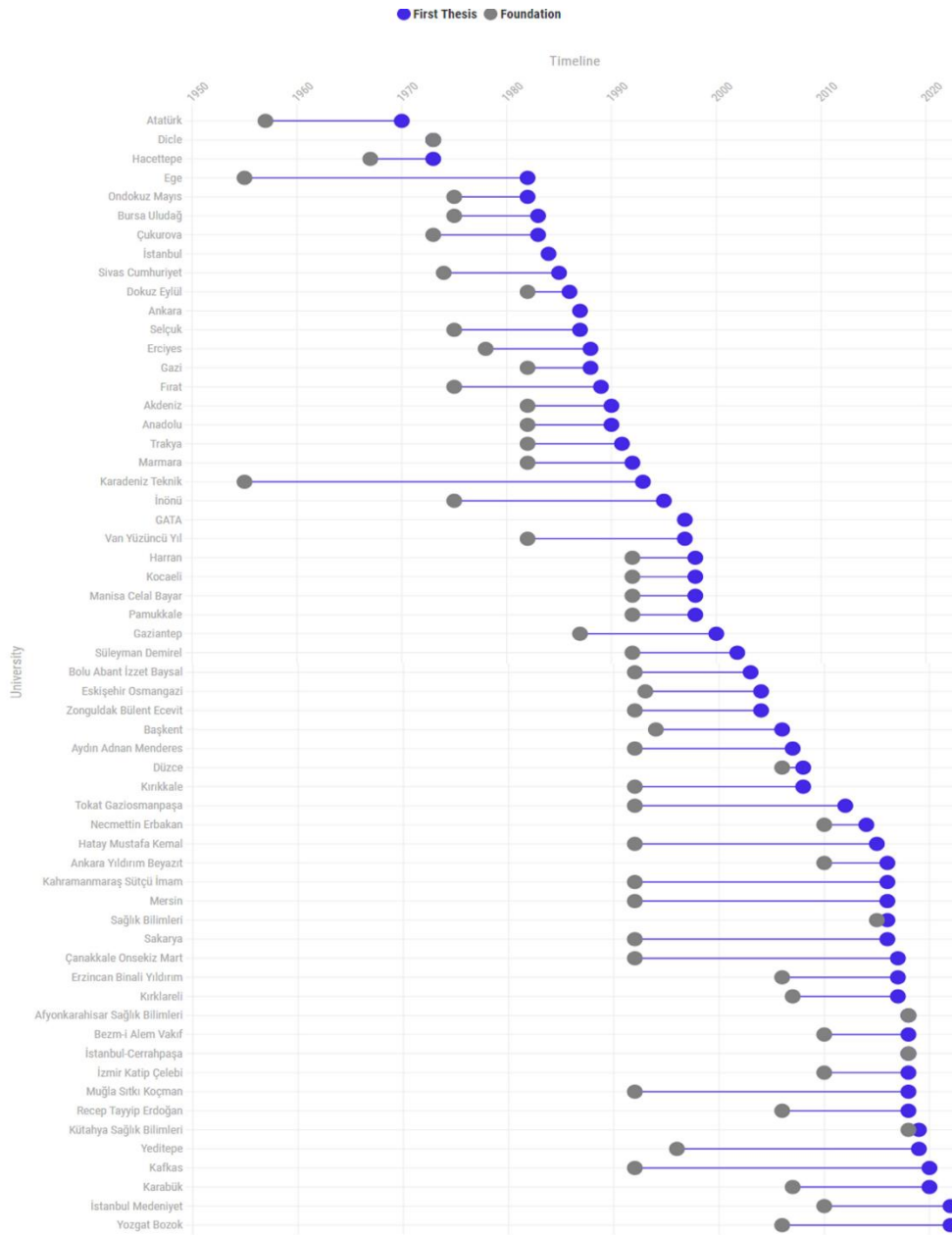
Within the scope of this study, of the 2623 theses examined, 38.2% (n=1002) were medical residency dissertations, 16.6% (n=436) were PhD dissertations, and 45.2% (n=1185) were master's theses. Across

Türkiye, there are 59 departments of public health in medical faculties. Of these departments, 94.20% (n=56) are in state universities, and 5.08% (n=3) are in private universities. 98.74% (n=2590) of the

conducted theses were in state universities, while 1.26% (n=33) were in private universities. The universities with the highest number of public health theses are Hacettepe University (n=204), Erciyes University (n=204), Istanbul University (n=203), Dokuz Eylül University (n=151), and Gazi University (n=140), respectively. Excluding master's theses, when examining PhD and residency dissertations in terms of total numbers, the ranking is as follows: Istanbul (n=133), Hacettepe (n=96), Dokuz Eylül (n=92), Ege

(n=82), Gazi (n=76).

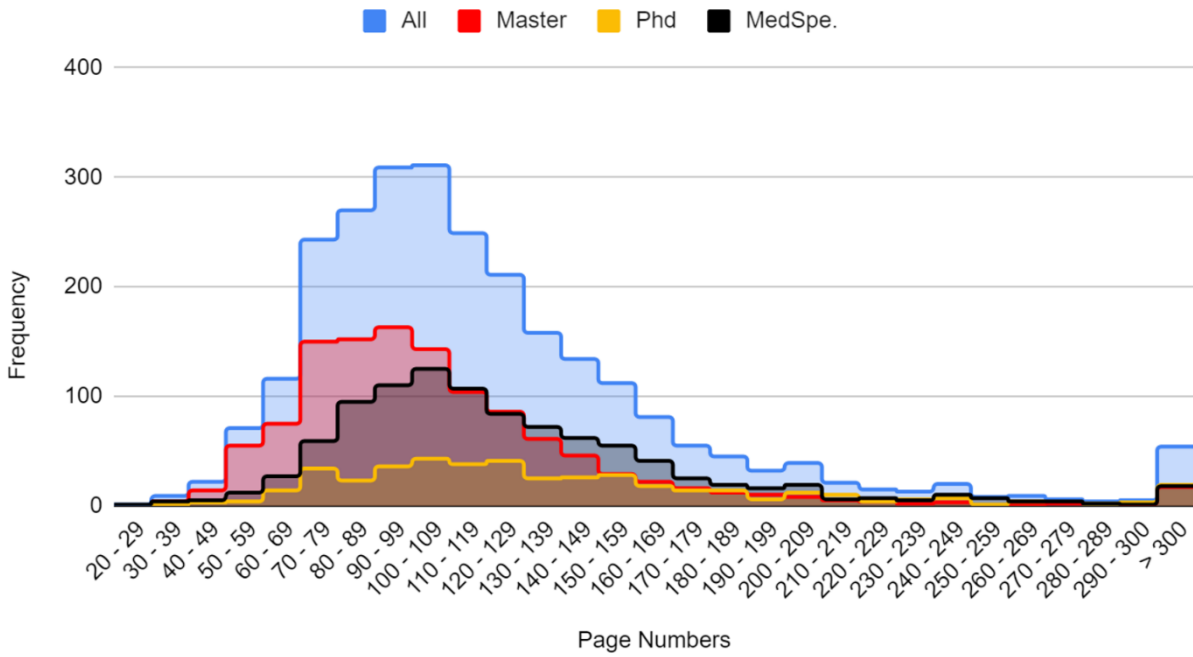
The publication years of the first public health theses and the publishing universities' establishment years are shown in Figure 1 (Interactive graphic access link: <https://public.flourish.studio/visualisation/14565898/>). According to this graph, the first thesis published in Türkiye was a medical residency dissertation at Atatürk University in 1970. The first master's thesis was published in 1973, and the first PhD dissertation was published in 1978 at Hacettepe University.



**Figure1:** The publication years of the first public health theses and the establishment years of the publishing universities in Türkiye.

When examining the distribution of the page counts of the theses, the median page count for all theses is 108 (IQR: 87-139). The median page count for master's theses is 99 (IQR: 79-122), for PhD theses is 124.5 (IQR: 98.75-165.25), and for medical residency dissertations is 115 (IQR: 94-147). The page count distributions for all theses are as shown in Figure 2.

The table developed for the examination of the theses according to their topics in public health is shown in Table 1. A total of 33 topics were identified in the examined reference works, and these 33 topics were categorised into three clusters (Main, Emerging, and Methodologic).



**Figure 2:** Distribution of all public health theses (PhD, residency dissertations and master's theses) conducted in Türkiye between 1970-2022 according to page counts.

**Table 1:** Subtopic categories used in reference works in the field of public health.

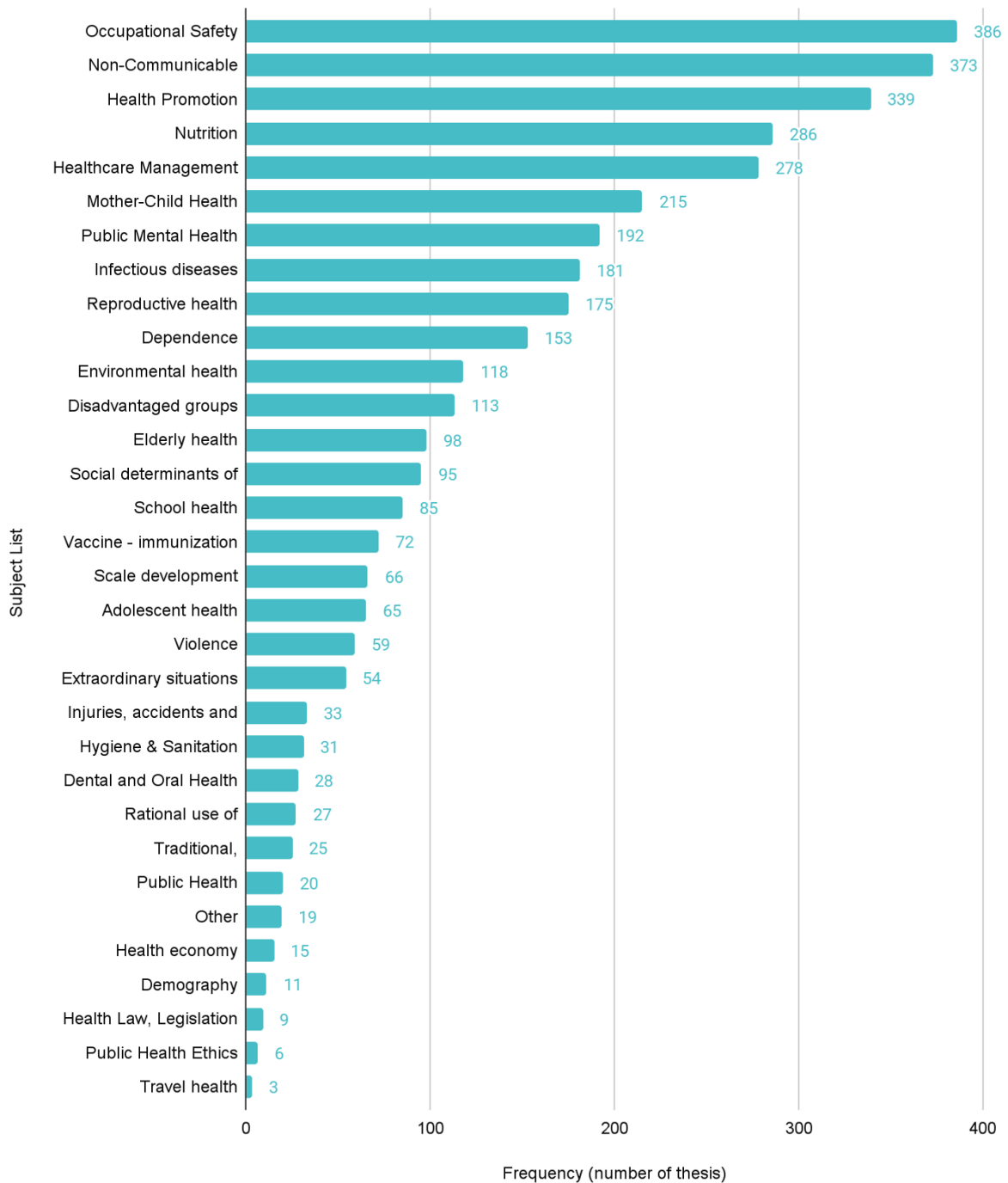
Subject Groups	Subtopics
Main	Adolescent Health
	Dental and Oral Health
	Mother-Child Health
	Vaccine - Immunization
	Nutrition
	Infectious Diseases
	Non-Communicable Diseases
	Environmental Health
	Traditional, Complementary and Integrative Medicine
	Hygiene & Sanitation
	Occupational Safety and Health
	School health
	Extraordinary situations and disasters
	Healthcare Management
	Travel health
	Public Mental Health
	Reproductive health
	Injuries, accidents and control
	Elderly health
Demography	
Emerging	Rational use of medicines
	Dependence
	Disadvantaged groups
	Global Health
	Violence
Methodologic	Epidemiology
	Public Health Informatics
	Public Health Humanities
	Health Promotion
	Social determinants of health
	Health economy
	Health Law, Legislation
	Scale development

In the study, the theses have been labelled with the topic headings in Table 1, except for the label "epidemiology." This exclusion is because epidemiology is a methodological science, and the scientific methods followed in most theses fall under the scope of epidemiology. However, as epidemiology is a central topic in public health in reference works, it has been included in Table 1.

The number of subject labels for the 2623 theses is 3630. The frequency distribution of these labels is as shown in Figure 3. Among the 32 topics, the

three most frequently addressed categories are occupational safety (n=386, 10.63%), non-communicable diseases (n=373, 10.28%), and health promotion (n=339, 9.34%), in descending order. The least frequent topics are travel health (n=3, 0.08%), public health ethics (n=6, 0.17%), and health law and legislation (n=9, 0.25%). An interactive video graph that presents the chronological ranking of topic frequencies from 1970 onwards can be accessed through the following link: <https://public.flourish.studio/visualisation/13936320/>

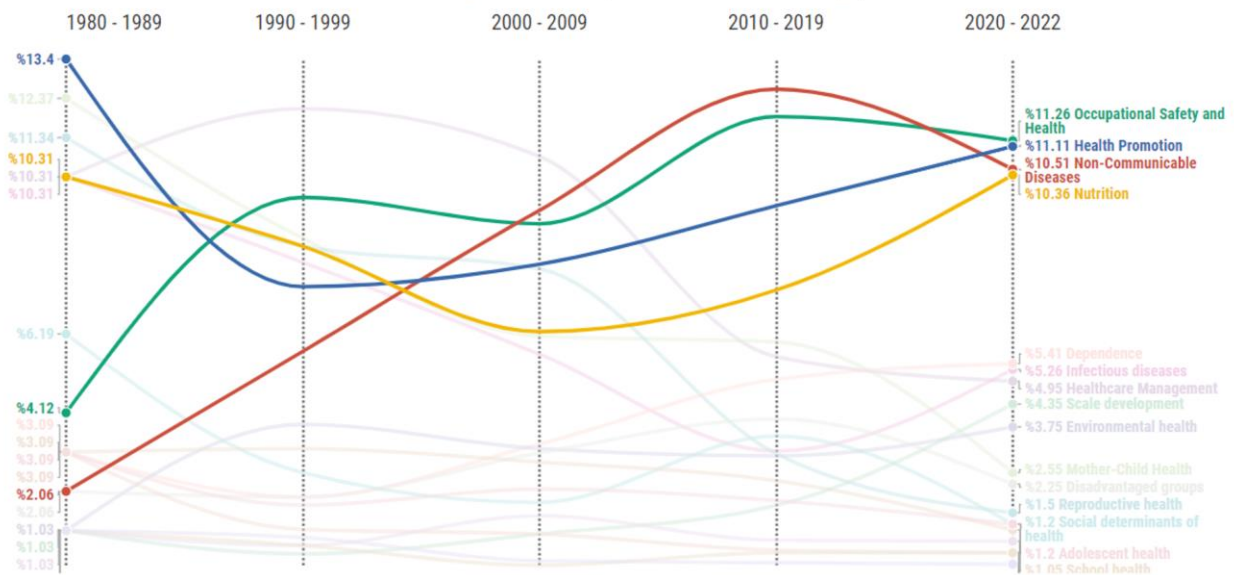




**Figure 3:** The frequency distribution of subtopic labels of all public health theses (PhD, residency dissertations and master's theses) conducted in Türkiye between 1980-2022.

Due to the limited number of records (only seven theses) between 1970 and 1979, this decade has been excluded from the visualisation. For the four decades from 1980 to 2022, an interactive graph has been created using the frequency table of topics. This allows the visualisation of trends in different public health fields over the four decades. The most commonly studied topics

from 2020 to 2022 (occupational safety, health promotion, non-communicable diseases, nutrition) have been highlighted in the graph. The static version of the chart is shown in Figure 4, and the interactive version can be accessed through the following link: <https://public.flourish.studio/visualisation/13938192/>



**Figure 4:** Trends in public health subfields studied in PhD, residency dissertations and Master's theses over the four decades between 1970-2022 in Türkiye.

As the thesis topics were labelled with multiple subject tags, a co-subject analysis was also conducted in our study. These labeled with at least two subject tags were included in this analysis. The relationships of co-occurrence between subjects were visualised using a Venn diagram and published as an online interactive graph

(Figure:5) (Link:<https://public.flourish.studio/visualisation/11579305/> ). According to this co-subject analysis, the most commonly studied co-occurring topics are health improvement and nutrition (n=54), health improvement and non-communicable disease (n=50), and mother-child health and nutrition.



**Figure 5:** The relationships of co-occurrence between subfields studied in public health theses in Türkiye between 1970-2022.



## Discussion

In this study, PhD, residency dissertations and master's theses conducted in the public health departments between 1970 and 2022, as indexed in the national Council of Higher Education Thesis Center, have been evaluated. The frequencies of topics studied in the field of public health, the changes in these topics over the years, and their interrelationships have been examined. A similar study analysing public health theses 11 years period exists; however, this study did not explore the interrelationships between topics, and its scope was limited to 11 years (16). Our study is original and comprehensive as it covers a 52-year period from 1970 to 2022, encompassing all types of theses and examining topics, their trends over the years, and their interactions.

Existing studies show that the United States, Western Europe, and Canada are leading in research production in the field of public health (15,21). There is evidence that other regions worldwide need to develop research infrastructure and engage in collaborative efforts (15). The extent to which the database sources reflect the publications in Türkiye is not fully known. Based on studies indicating that non-English health articles are underrepresented, it is estimated that a significant portion of Turkish publications is not included in international databases (22).

The higher number of master's theses compared to PhD and residency dissertations might be influenced by the shorter duration of master's education (2 years) compared to the other programs (4 years each). Upon examining the universities with the highest thesis counts, it can be observed that these universities are among Türkiye's oldest institutions. Naturally, newly established universities have fewer theses. The top three universities with the highest number of publications are Istanbul University, Hacettepe University, and Erciyes University. In a study examining theses from 2009 to 2019, the universities with the most publications were reported to be Erciyes University, Dokuz Eylül University, and Istanbul University (16). Therefore, while Erciyes University and Dokuz Eylül University have published more theses in recent years, when considering all publications from 1970 to the present, Istanbul University takes the lead, followed by Hacettepe University and

Erciyes University. Although the ratio of private universities among universities is 5.08%, 1.26% of all theses came from private universities. This may be due to the fact that private universities were established more recently than state universities.

Analyzing the page counts of the theses, numbers exceeding 353 pages were considered as outliers based on the Z-scores of 32 theses. The highest page count of 41,344 pages is associated with a thesis document that was not accessible through the CoHE thesis centre, and a detailed examination could not be performed. The validity of this figure should be clarified.

When examining the growth rate of thesis studies in Türkiye over the years, an increase is observed. A study shows that there has been an increase in scientific production globally across all regions. While North America exhibits the lowest growth rate, it has the highest number of documents, meaning that its relative weight on a global scale has decreased despite the overall increase in publication volume (21). This trend in leading regions also suggests that research efforts in the field of public health are increasing globally, with a larger share of the total output in these pioneering regions.

In the scope of this study, an attempt was made to identify the fundamental and sub-disciplines of public health by examining reference works in the field. However, it was observed that there is a significant intersection between the topics. For example, the topic of breastfeeding can fall under both maternal and child health and nutrition. Similarly, adolescent health and reproductive health have a large intersection area. Therefore, creating a definitive table has been challenging for researchers, as determining and classifying topics requires an understanding of the philosophical foundations of the field. It is evident that making sharp distinctions between topics is not accurate or feasible, and the extent to which each study fits into different sub-disciplines can be debated. Despite this challenge, researchers' own identification and clustering of topics have been presented in the table as a pioneering effort. Advanced studies can further refine this table. Categorising the 33 topics under Main, Emerging, and Methodological headings offers an original classification proposal for a

field like public health, where many topics intersect. The categorisation of the topics within the evolving framework of public health, conceptualised by Winslow in 1920, is also crucial for the field's development. Critiques from other researchers regarding this proposal will be critical for the evolution of this categorisation.

When examining the distribution of thesis topics across all years and all types of theses, the five most commonly studied topics are occupational safety, non-communicable diseases, health promotion, nutrition, and health management. A study analysing master's, doctoral, and medical residency theses in the field of public health from 2009 to 2019 identified the three most commonly studied topics as occupational health, reproductive and women's health, and non-communicable diseases and disability (16). While occupational health and non-communicable diseases continue to be the most studied topics over all years, health promotion has replaced women's reproductive health as one of the top three topics. In our study, when examining cumulative thesis counts over the years, it can be observed that the most studied topics were health promotion and communicable diseases in 1980. By 1990, the top three were health promotion, communicable diseases, and nutrition. By 2000, the top three shifted to health management, reproductive health, and communicable diseases. In 2010, the top three included health management, occupational health, and health promotion. By 2022, the most studied topics were occupational health, non-communicable diseases, and health promotion. Analysing the frequency analysis of topic headings studied over four decades from 1980 to 2022, the top five topics are health promotion, nutrition, non-communicable diseases, occupational health, and community mental health.

The fact that the least studied topics are the ones most keenly felt in today's context is noteworthy. During the COVID-19 pandemic in 2020, one of the significant contributing factors to the spread of the pandemic was international travel, and one of the earliest measures taken was travel restrictions. In this context, it can be argued that the topic of travel health has been

neglected. Similarly, public health ethics is a topic gaining prominence today, particularly in the context of ethics surrounding artificial intelligence. Given that public health practices often involve situations where individual and community interests conflict, policies need to be established on an ethical and legal basis. Therefore, the attention these topics receive is not just a preference but a necessity.

When looking at the last 40 years, there has been a rapid increase in the trend of non-communicable diseases in Türkiye, while the trend of communicable diseases has significantly decreased. However, between 2020 and 2022, this trend has paused and even reversed. The increase in the trend of communicable diseases and the decrease in non-communicable diseases could have been influenced by early publications related to COVID-19. In 2021 and 2022, a total of 27 theses are related to the COVID-19 topic.

In the scope of this study, a co-subject analysis was conducted and visualised using a Venn diagram, which was presented as an interactive online relationship map for researchers working in the field. It's important to note that the ranking of topics in the co-subject diagram does not match the ranking in the frequency graph (Figure 3) due to the inclusion of single-labelled theses in the frequency graph, while the Venn diagram only includes topics labelled with 2 or 3 tags. Upon examining the diagram, the highest correlation is observed between health promotion and nutrition. The second most significant correlation is between nutrition - maternal and child health and health promotion - non-communicable diseases. The Venn diagram is also important for providing hints about some correlations. For example, community mental health has the most significant co-occurrence with occupational health. The immunization topic is most frequently studied in conjunction with health management. These co-occurrences are essential for investigating causal relationships between related topics. Additionally, the topics that are studied together the least can provide new researchers with insights into neglected areas of research.

## Conclusions

This study sheds light on the past 50 years of public health science in Türkiye. The theses indicate the public health agendas within the 2-4 year period before their publication, including the preparation process. In fact, turning topics of current interest into theses and publications takes around 2-4 years. The study presents changing trends in topics over the years and their interrelationships. It offers valuable insights for new researchers, such as the direction of scientific development in a main discipline, the areas that are overly studied or left unexplored, the interconnectedness of bibliometric accumulation in the field, and similar descriptive information that can serve as a roadmap. Therefore, monitoring the pulse of the public health field through

bibliometric analyses, periodically repeating and deepening these studies, holds special significance. This study aimed to contribute to this vision.

### Limitations

This study aimed to evaluate the fundamental working topics of public health and only examined PhD, residency dissertations, and master's theses; original research articles were not evaluated.

### Conflict of Interest

This research was funded by the researchers themselves. No financial or organisational support was received, and there are no conflicts of interest.

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