



A Scoping Review of Theses and Dissertations on Pedestrian Crossing Behavior



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ABSTRACT

Aims Academic research plays a crucial role in managing public health and risks. Dissertations and theses are more advanced than articles in producing new knowledge. A review of these academic works on pedestrian safety can reveal unique findings in this domain and enable cross-country comparisons that can inform the selection of dissertation topics for professors and improve student supervision. This scoping review conducted a comparative analysis of Iranian and international theses/dissertations concerning pedestrian crossing behavior.

Information & Methods This scoping review adhering to the Joanna Briggs Institute guidelines and incorporating Arksey & O'Malley's framework, examined key aspects of electronic theses and dissertations from Iran and other countries, focusing on the number of electronic theses and dissertations, relevant ministries, temporal trends, departments, academic levels, target demographics, and keywords.

Findings This study encompassed seven Iranian electronic theses and dissertations and eight international electronic theses and dissertations in English, spanning from 2019 to 2023. A comparative analysis revealed distinct differences. Iranian electronic theses and dissertations lacked contributions from the Information and Communication Technology Innovation and Humanities and Social Sciences, whereas the Health Sciences departments demonstrated notable activity. Internationally, such activity was absent. Additionally, the name of the study location emerged as a prevalent keyword within Iranian electronic theses and dissertations. Most electronic theses and dissertations, regardless of origin, did not specify particular pedestrian target populations.

Conclusion Given the complexity of pedestrian crossing behavior safety, interdisciplinary collaboration is essential for designing comprehensive studies in the form of theses and dissertations, particularly within the Iranian context.

Keywords Academic Dissertation; Theses; Pedestrians; Safety; Comparative Review

CITATION LINKS

[1] The idea of a ... [2] Plato's academy: The world's first ... [3] Proposals by member states for the celebration ... [4] What are universities ... [5] Thesis Vs. dissertation-know ... [6] An investigation of methodological format ... [7] Examination of observed principles in scientific ... [8] Guide to the successful thesis and dissertation ... [9] What Is a ... [10] How to write a review ... [11] How to write a review ... [12] The anatomy of an excellent review ... [13] Analyzing the past to prepare for the future ... [14] Why publish review articles? Why write review ... [15] Scoping studies: Towards a methodological ... [16] Examining the status of child health as the subject ... [17] Theses on ... [18] Content analysis of ... [19] Factors influencing pedestrian safety ... [20] Who goes first? A distributed simulator study of ... [21] Pedestrian safety attitudes and self-declared ... [22] Systems-based approach to investigate ... [23] Developing an agent-based model for spatial ... [24] Autonomous vehicles that interact with pedestrians ... [25] From pandemics to pedestrian crossings ... [26] WHO kicks off a decade of action for road ... [27] Studying critical pedestrian behavioral changes for the safety assessment ... [28] Macroscopic and microscopic dynamics of a pedestrian ... [29] Evaluation of research projects and theses ... [30] Updated methodological guidance for the conduct of scoping ... [31] Scoping ... [32] Global status report on road safety ... [33] Burden of road traffic injuries in Iran: A national and subnational ... [34] Older children and young adolescent mortality ... [35] Impact of social and technological distraction on pedestrian ... [36] Ageing and ... [37] Prevalence of psychiatric disorders in ... [38] Global report on health equity for persons ... [39] Socioeconomic disparities in using rehabilitation ... [40] Presentation of a pedestrian's crossing behavior ... [41] Pedestrians' role in road ... [42] Effectiveness of interventions for mobile phone distracted pedestrians ... [43] Improved keyword extraction for Persian academic ... [44] Semantic unsupervised automatic keyphrases extraction ...

Introduction

Academic research is pivotal in governing societal health and its associated risks. Universities stand out from other educational institutions as the mainstays of scientific progress, chiefly due to their research-driven pedagogy [1]. The inception of Plato's Academy in 400 BCE is frequently referenced as the original archetype for the university paradigm. Nonetheless, it is the establishment of Jundi Shapur University in 270 CE that is acknowledged for mirroring the structural archetype of modern universities [2,3]. Over the centuries, universities have transformed into complex entities that play a crucial role in driving economic, social, and cultural progress through research [4]. This research is often conducted by students through the composition of theses or dissertations. The purpose of such academic compositions is to cultivate the students' research skills within their respective fields, thereby enhancing their scholarly proficiency and contributing to the collective scientific corpus [5]. Theses represent the extensive research efforts of students under the guidance of academic mentors [6]. The composition of a thesis necessitates profound intellectual engagement from students, fostering a critical appraisal of the validity and applicability of their research. This introspection is vital for their academic maturation [7]. A thesis should not only contribute original knowledge but also guide students toward addressing societal challenges and preparing them for future endeavors [8]. Supervisors play an instrumental role in maintaining the rigor and accuracy of the thesis, assisting in the identification of groundbreaking and socially relevant subjects, and guiding the development of appropriate research inquiries [9].

Review articles are integral to the dissemination of knowledge, distilling and consolidating information from a multitude of scientific publications within a specific discipline [10]. By offering a curated synthesis of extensive scientific literature, review articles provide readers with a comprehensive and current understanding of a research field [11]. These articles often identify new avenues for research and can reinterpret existing data to draw fresh conclusions. They shape the research landscape both retrospectively and prospectively by critically evaluating existing literature, thus fostering the progression of the field [12, 13]. While they do not present new empirical findings, review articles meticulously evaluate the literature, highlighting research gaps and suggesting directions for future studies [14].

Review studies, including systematic reviews, meta-analyses, and scoping reviews, serve distinct academic purposes. Scoping reviews are particularly useful for exploring complex or emerging topics, aiming to map the research landscape, assess the

need for systematic reviews, and identify gaps in the literature [15].

The dissemination of an article typically experiences a temporal lag compared to the presentation of a thesis. Consequently, it is reasonable to assert that theses often precede articles in the progression of knowledge. Indeed, not all theses result in published articles due to various factors, leaving a portion of knowledge unpublished in academic journals. Therefore, integrating theses into review articles can be highly beneficial. However, a Google Scholar search from 2018 to 2023 reveals a limited number of thesis-based reviews, with existing ones primarily focusing on dissertation critiques or specific areas such as children's health, tourism in Iran, and urbanization in America [16-18].

Walking is a prevalent mode of transportation globally, with individuals of diverse ages, genders, and social backgrounds participating in the traffic ecosystem. Pedestrian crossings, though a minor segment of their journey, significantly influence traffic safety and efficiency [19, 20]. Vulnerable road users, including pedestrians, account for 23% of global road fatalities and are disproportionately affected [21]. Despite advancements in vehicular safety that benefit drivers, pedestrian accident rates have not seen a commensurate decline [22], and urban congestion has led to a vehicle-centric traffic environment [23]. These trends underscore the need to focus on pedestrian crossing behavior (PCB), which is critical for the operational strategies of autonomous vehicles and overall traffic safety [24]. Cities that prioritize pedestrian safety can experience significant improvements in public health outcomes [25].

The World Health Organization's road safety targets for 2011-2020 were not fully met, prompting the UN General Assembly to launch the UN Road Safety Collaboration for 2021-2030, with the goal of reducing road traffic fatalities and injuries by half [26]. There is a global consensus on the urgency of prioritizing pedestrian safety, particularly in low- and middle-income countries, where the risk to pedestrians is markedly higher [27, 28]. Although numerous studies have focused on traffic safety, there is a discernible lack of review articles that synthesize theses on PCB. Academic research plays a crucial role in societal health and risk management; therefore, it is essential that thesis topics are carefully selected to help mitigate risks within society. Reviewing university theses comparatively provides insight into the dominant trends in research and reveals the pace at which research is advancing. This examination also identifies gaps between existing research efforts and optimal practices [29]. This scoping review conducted a comparative analysis of Iranian and international theses/dissertations concerning PCB.

Information and Methods

This scoping review was structured according to the Joanna Briggs Institute (JBI) guidelines [30, 31], integrated with Arksey & O'Malley's framework [15]. The review compared the key characteristics of Iranian and international electronic theses and dissertations (ETDs) on PCB, gathering data on the number of ETDs, relevant ministries, temporal trends, departments, academic levels, target populations, and keywords. The search commenced with the selection of suitable databases, including Nopa (which includes only medical ETDs; 67 cases) and Ganj (two cases) for Iran. Internationally, databases, such as Base-search, Dart Europe (13 cases), ProQuest (two cases), NDLTD (two cases), and OATD (three cases) were utilized. Searches conducted in September 2023 used the terms "passer crossing behavior" and "pedestrian crossing behavior" for international ETDs, yielding 99 ETDs (69 Iranian and 30 international) from 2019 to 2023. The selection process involved the exclusion of ETDs unrelated to PCB and duplicates. An initial screening

removed 43 ETDs (27 Iranian, 16 international) due to irrelevance or duplication.

Further scrutiny excluded an additional 31 ETDs (25 Iranian, six international) for the same reasons, including irrelevance or unavailability of the full text. This refinement resulted in a total of 25 ETDs (17 Iranian, 8 international) that were eligible for the scoping review.

Notably, the international ETDs predominantly originated from developed nations, including France, Slovenia, Finland, the United States, the Netherlands, Portugal, the United Kingdom, and Sweden (Figure 1).

A thorough examination of the 25 remaining ETDs was conducted to extract relevant information, involving multiple readings to clarify complex terminology. A five-member team verified and systematically categorized the data.

The frequency and relative frequency of pertinent data from the Iranian and international ETDs were tabulated, facilitating a comparative analysis of trends in PCB research.

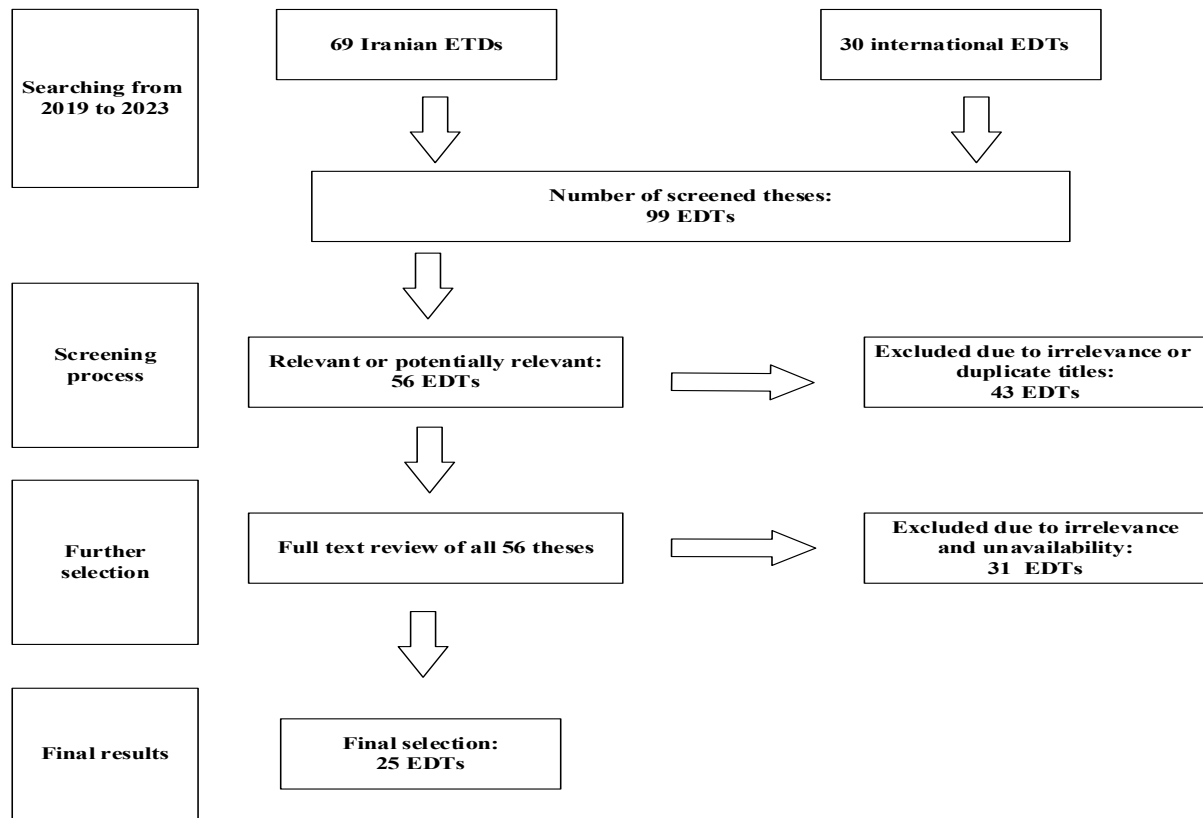


Figure 1. Search and final selection of electronic theses and dissertations (ETDs)

Findings

The number of ETDs

In the analyzed sample of 25 ETDs, 17 originated from Iran, while eight were international contributions.

Relevant ministries

The investigation of the 17 Iranian ETDs on PCB indicated that 16 were registered in the Ganj

database, associated with the universities of the Ministry of Science, Research and Technology, while only one was recorded in the Nopa database, linked to the universities of the Ministry of Health and Medical Education.

Temporal trends

The temporal analysis of ETDs reflected fluctuating global and Iranian interest in PCB (Table 1).

Table 1. Yearly relative frequency of electronic theses and dissertations (EDTs) from 2019 to 2023

| Year | International | Iran |
|------|---------------|------|
| 2019 | 25 | 35.5 |
| 2020 | 0 | 41.2 |
| 2021 | 0 | 23.5 |
| 2022 | 62.5 | 0 |
| 2023 | 12.5 | 0 |

Departments

Regarding the departmental origins of the 25 EDTs reviewed, 11 of the 17 Iranian EDTs (64.7%) originated from transportation departments (Table 2).

Table 2. Departmental contributions to electronic theses and dissertations (EDTs) on pedestrian crossing behavior

| Department | International | Iran |
|--|---------------|------|
| Traffic engineering and architecture | 3 | 11 |
| Transport infrastructure and logistics | 2 | 3 |
| Health sciences | 0 | 2 |
| Engineering psychology | 1 | 1 |
| Humanities and social sciences | 1 | 0 |
| ICT innovation | 1 | 0 |

Educational level

An assessment of the educational levels of EDTs pertaining to PCB revealed a disparity in Iran compared to the international landscape. A significant majority of Iranian EDTs (82.3%) were master's theses with 14 EDTs, while doctoral theses constituted only 17.6% with 3 EDTs.

Target populations

An examination of the titles of 25 EDTs revealed a primary focus on PCB within the general population, with a notable lack of research targeting specific groups, such as children, the elderly, individuals with disabilities, and rural pedestrians. Within this cohort, only one Iranian EDT was dedicated to children's pedestrian behavior.

The analysis of 109 keywords from EDTs on PCB resulted in their categorization by thematic similarity.

The categories of user traffic behaviors, behavioral influences, environmental factors, and methodological and analytical approaches were proportionally represented in both Iranian and international contexts. Conversely, the categories of study location's name, theoretical frameworks, and intervention strategies exhibited divergent proportions (Table 3).

Table 3. Categorized keyword frequency in the electronic theses and dissertations (EDTs) on pedestrian crossing behavior

| Title | International | Iran |
|---------------------------------|---------------|------|
| Theories | 0 | 6 |
| Proposal for intervention | 5 | 2 |
| Measurement indicators | 2 | 6 |
| Methodologies and data analysis | 10 | 12 |
| Location | 1 | 9 |
| Environment | 2 | 2 |
| Factors affecting behavior | 9 | 19 |
| Users' traffic behaviors | 13 | 11 |

Discussion

This scoping review conducted a comparative analysis of Iranian and international theses/dissertations concerning PCB. The review of EDTs across various disciplines revealed the foundational elements and progression within academic institutions, thereby informing and shaping subsequent research endeavors. Such a review synthesizes the latest advancements and unique topics within a single scholarly work, pinpointing research gaps that are pivotal for strategizing university research agendas. Consequently, this study aimed to benchmark the Iranian EDTs against global EDTs in the realm of PCB.

In this study, a corpus of 25 EDTs was scrutinized, comprising 17 theses from 14 Iranian universities registered in the Ganj and Nopa databases, alongside eight EDTs documented in English within international databases, including ProQuest, NDLTD, DART EUROPE, OATD, and EBSCO Open. While this sample may not encapsulate an exhaustive perspective, it can nonetheless offer overarching insights.

The increase in the number of Iranian EDTs compared to international EDTs (2.1 times) may reflect several underlying factors. Global academic protocols often mandate a publication embargo post-defense, typically lasting three to five years, a practice that is variably adhered to in Iran. Additionally, the exclusion of non-English international EDTs from this analysis, coupled with the norm of publishing theses in the national language, as observed in Iran, contributes to this discrepancy. Furthermore, it is important to acknowledge the global research focus on autonomous vehicles, which tends to overshadow studies on pedestrian behavior—the focal point of this investigation. In Iran, pedestrian casualties accounted for 22% of traffic-related fatalities in 2017, with an age-standardized mortality rate of 8.8 per 100,000 individuals in 2019 [32, 33]. This significant concern propels further research into pedestrian safety, thereby guiding the trajectory of university EDTs within the nation. Despite the numerical imbalance, with Iranian EDTs outnumbering international ones, the comparative review can yield valuable insights. Notably, out of 17 Iranian dissertations, 16 were submitted to the Ganj database (related to the universities of the Ministry of Science, Research and Technology), while one dissertation was submitted to the Nopa database (related to the Universities of Medical Sciences in the Ministry of Health, Treatment, and Medical Education). The disproportionate representation may be attributed to the nascent stage of the Nopa system and the prevailing focus on traffic engineering within the Ministry of Science, Research, and Technology. Nevertheless, considering the societal significance of health issues, an increased research contribution from the Ministry of Health and Medical

Education and its universities is warranted. The study did not extend this comparative inquiry internationally due to the typical unification of higher education under a single ministry in other countries. Internationally, there is a discernible upward trajectory in interest in PCB, whereas Iran exhibits a downward trend. The COVID-19 pandemic may account for these variations, given its disparate impact across nations. Nonetheless, attributing these trends solely to the pandemic is speculative, as such patterns could emerge sporadically over brief periods. In this study, 64.7% of ETDs in Iran originated from transportation departments, which aligns with these departments' integral role in pedestrian safety research. However, the involvement of departments specializing in behavioral sciences, risk management, and health education is crucial for a comprehensive approach to PCB.

The data indicated that transportation-related departments, encompassing Traffic Engineering and Architecture, as well as Transport Infrastructure and Logistics, were predominantly engaged, representing 11 of the Iranian ETDs and five of the international ETDs. The findings also underscore the international diversity in departmental involvement, with Health Sciences active in Iran but absent abroad, and humanities and ICT departments unrepresented in Iran. These patterns highlight the necessity for interdisciplinary research and collaboration in Iran, particularly between ICT and other fields, to enhance pedestrian safety through predictive behavior models and intelligent system design.

A significant majority of Iranian EDTs were master's degrees. This contrast mirrors the international distribution and may stem from the restricted availability of doctoral programs in relevant fields within Iran, rather than from mere statistical variance in a limited dataset.

The examination of the titles of EDTs revealed a primary focus on PCB within the general population, while road traffic injuries are a leading cause of death and chronic disability among children aged 5 to 14 [34]. Additionally, individuals under 18 and the elderly are disproportionately affected by pedestrian incidents [35]. With demographic shifts, indicating an increase in the elderly population—expected to rise from one billion in 2020 to 1.4 billion by 2050 [36]—and with 69.9% of Iran's population currently classified as elderly [37], there is a clear imperative for research that addresses the needs of these growing demographics.

Among the international ETDs on PCB, only one out of eight addressed disabled pedestrians, despite disability being a significant public health concern affecting approximately 1.3 billion people globally (16% of the population) [38] and 1 to 4% of Iran's population [39].

The study also highlighted a research shortfall concerning rural pedestrians. In Iran, 40% of road

accidents occur on suburban roads [40], and in Europe, 31% of pedestrian fatalities happen in non-urban areas [41]. Yet, only one Iranian thesis focused on extra-urban roads, with none internationally, indicating a need for more research on rural pedestrian safety.

Furthermore, the impact of mobile phone usage on pedestrian safety is emerging as a critical issue. Distractions from mobile devices are known to reduce awareness and contribute to unsafe traffic behaviors [42]. Despite its relevance, this topic is underexplored in international ETDs, potentially due to publication timing constraints, although it is well-documented in articles. This gap suggests a disparity between the research focus and the evolving challenges of pedestrian safety.

Keywords encapsulate the essence of a text, serving as pivotal elements for document retrieval and thematic categorization [43]. In the realm of artificial intelligence, particularly in text mining and natural language processing, keyword extraction is fundamental for information retrieval, as it reflects the document's content and aids in database searches and document recommendations [44]. The objective of the current study was to discern the overarching thematic trends, making the comparison of keywords from the examined ETDs crucial.

The examination of the patterns in categorized keyword frequency in the ETDs highlighted distinct research focuses and gaps in PCB studies between Iranian and international academic literature. Iranian theses frequently incorporated theoretical frameworks as keywords, a feature that is absent in international theses. Additionally, Iranian works exhibited fewer intervention-related keywords, possibly indicating study-specific constraints in implementing interventions in Iran. Moreover, the name of the study location was identified as a more common keyword in Iranian theses. Although MeSH terms are associated with the PubMed database and are primarily used in the medical field, they typically do not include the name of the study site as a keyword.

The main limitation encountered in this study was the paucity of theses and dissertations recorded in the databases. Furthermore, restricted access to full texts, particularly from international databases, may have constrained the scope of the review.

Based on the findings, future research should focus on conducting targeted studies on specific pedestrian groups, such as children, the elderly, and individuals with disabilities, exploring pedestrian behaviors in non-urban settings, including villages, towns, and traffic routes beyond city streets, assessing the influence of mobile and digital device usage on road user behavior, and employing an interdisciplinary methodology that integrates the humanities and computer science, particularly artificial intelligence, with engineering to enhance pedestrian safety research.

Conclusion

Given the complexity of PCB safety, interdisciplinary collaboration is essential for designing comprehensive studies in the form of theses and dissertations, particularly within the Iranian context.

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