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Person-environment fit of formal and informal caregivers for older adults: a scoping review

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Abstract

Background Caring for older adults is a dynamic and complex process, and analyzing personal and environmental factors separately fails to capture its full nature. The person-environment fit theory offers a valuable framework to explore interactions between caregivers and their environments. This review aimed to synthesize evidence on the person-environment fit of formal and informal caregivers for older adults, identify gaps in existing literature, and propose future research directions.

Methods The scoping review was conducted following the six-step guidance of the Joanna Briggs Institute 2020. A literature search was conducted in June 2024 across seven databases: Scopus, ProQuest, Web of Science, Embase, PubMed, MEDLINE, and CINAHL. Empirical studies published after 2000 regarding the person-environment fit of caregivers for older adults were included.

Results A total of 15 eligible articles were included, with nine focusing on formal caregivers and six focusing on informal caregivers. Research on formal caregivers' person-environment fit often came from human resource management perspectives and was supported by various theories. In contrast, studies on informal caregivers tended to draw from environmental gerontology theories and lacked a systematic analytical model. Most studies used self-designed questionnaires or interviews, with one employing a standard person-environment fit measurement scale. Caregivers' person-environment fit was analyzed through "demands-abilities fit" and "needs-supplies fit" dimensions, covering various types like person-physical, person-interpersonal, value, goal, and caregiving-life fit. Findings indicated that a high level of person-environment fit was associated with better physical and mental well-being, stronger caregiving commitment, and improved care quality.

Conclusion The holistic and dynamic nature of person-environment fit theory is closely aligned with the caregiving process, enhancing our understanding of the experiences of caregivers. Based on existing evidence, this review proposes a theoretical framework for analyzing informal caregivers' person-environment fit. Further investigation into the theoretical framework of caregiver person-environment fit, along with the development of standardized assessment instruments, will significantly advance the well-being of both caregivers and care recipients.

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Keywords Person-environment fit, Formal caregiver, Nursing, Informal caregiver, Scoping review, Older adults, Theoretical framework, Well-being

Background

The demand for care for older adults is expanding, driven by the rapid growth in the proportion and size of the global aging population [1]. As a result, formal and informal caregivers are becoming increasingly necessary and are forming partnerships to support frail older adults [2, 3]. Formal caregivers are trained professionals employed by institutions or organizations to provide paid care [3]. In contrast, informal caregivers are typically family members, friends, or neighbors who provide unpaid care for older individuals [4]. The World Health Organization (WHO) has highlighted the crucial role of both formal and informal caregivers in reducing the vulnerability of older adults and improving their well-being [5]. Furthermore, the WHO has emphasized the need to recognize caregivers' difficulties and rights and ensure that they receive the necessary support and training [6].

Caring for older adults is a highly dynamic and complex process, influenced by the interaction between the environment and the individual [7]. First, changes in the interpersonal environment can lead to shifts in caregiving relationships. For example, the decline in physical and cognitive functions of older adults is often unpredictable. If older adults experience a fall or develop cognitive impairments, their need for caregivers increases dramatically, leading to adjustments in caregiving strategies and responsibilities [8]. Caregivers must be prepared to respond to these changes and promptly adapt their mindset and coping strategies to accommodate the transition [9]. On the other hand, caregivers often face the expectations of multiple roles. Informal caregivers who care for their aging parents may also need to look after their children or manage their jobs, thus requiring a balance between life and caregiving [7]. Meanwhile, formal caregivers should also adhere to organizational and leadership task assignments while flexibly adjusting their work plans as needed [10].

Furthermore, changes in the social environment can significantly impact the caregiving process. For instance, during the COVID-19 pandemic, family caregivers had limited access to formal and informal support resources, which intensified the stress and burden [11]. Care workers in nursing homes also faced significant challenges due to workforce shortages, the availability of protective equipment, and institutional policies [12]. Therefore, both formal and informal caregivers must deal with multiple tests of environments. They need to effectively integrate their interactions with the environment to maintain their well-being and ensure the quality of care.

Previous research on caregiving tends to analyze personal and environmental factors in isolation. For example, studies that adopt an individual-based approach typically focus on personal characteristics such as gender, relationships, marital status, and employment status as factors influencing caregiver stress [13, 14]. In contrast, other research has centered on environmental factors, including geographical location [15], assisting facilities [16], social supports [17], and cultural values [18]. However, these one-dimensional perspectives fail to capture the complex interplay between individuals and their environment during the caregiving process, making it insufficient for developing comprehensive and effective caregiver intervention strategies.

The person-environment fit theory posits that an individual's well-being and performance are influenced by how well their personal attributes and needs align with the features and demands of their environments [19]. It provides a promising perspective by emphasizing the congruence between the individual and the environment, which goes beyond models that only incorporate individual and environmental factors separately [18]. Therefore, examining the person-environment fit of caregivers would help researchers have a more integrated understanding of the caregiving process, which is crucial for informing the development of targeted interventions and support services.

The person-environment fit theory has been widely used in the fields of management and occupational psychology to facilitate research on human resource allocation, organizational efficiency optimization, and employee health [20]. Meanwhile, as promoted by environmental gerontologists, the person-environment fit theory has also been used to assess the needs and well-being of vulnerable groups such as older adults [21] and people with disabilities [22]. However, few scholars have applied the theory in the context of caregiving, whether formal or informal, which has limited the in-depth development of caregiver research.

A preliminary search was conducted in MEDLINE, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis, and no current or ongoing systematic reviews or scoping reviews on the topic of "caregivers' person-environment fit" were found. Given that the scoping review methodology offers a valuable approach to evaluating and comprehending the extent of the knowledge in a developing field [23], we selected this method to synthesize the existing literature.

The review aims to systematically map the existing empirical evidence on the person-environment fit of

caregivers for older adults. It focuses particularly on relevant theories and seeks to address and refine gaps within the theoretical framework. Additionally, the review proposes directions for future research based on a discussion of the findings. This scoping review has investigated the following questions:

- a) How has existing literature examined the person-environment fit among caregivers?
- b) What are the similarities and differences in the studies on the person-environment fit of formal and informal caregivers?
- c) What connections exist between caregivers' person-environment fit and their well-being and effectiveness in caregiving?

Methods

Design

This scoping review followed the six-step process outlined by the Joanna Briggs Institute (JBI) [23], which builds upon and refines earlier guidelines proposed by Arksey & O'Malley [24] and Levac et al. [25]: (1) establishing a clear research question; (2) determining inclusion criteria; (3) formulating a search strategy; (4) screening and selecting evidence; (5) extracting and analyzing data; (6) presenting results [23]. Additionally, this scoping review was reported in accordance with the PRISMA-ScR checklist (Additional file 1) [26], and the review protocol was registered on the Open Science Framework platform (<https://doi.org/10.17605/OSF.IO/YV26C>).

Eligibility criteria

The eligibility criteria were determined using the JBI methodology, which included participants, concept,

context, and source type [23]. The target population for this review consisted of formal and informal caregivers for older adults. The main concept was “person-environment fit”. There were no strict contextual restrictions, so different caregiving settings, such as institutions, communities, or homes, could be included in the review.

The specific inclusion criteria were: (1) peer-reviewed articles; (2) the target population was caregivers for individuals aged 60 or above, in accordance with the WHO's definition of older adults [6]; (3) studies explicitly addressing person-environment fit or applying related theoretical frameworks. Articles published in English were selected primarily due to English being the predominant language in global academic research. Many leading journals and databases in the fields of caregiving, nursing, and gerontology are published in English, which guarantees access to the most comprehensive and up-to-date studies on this topic. Various study designs were included, encompassing quantitative, qualitative, and mixed-methods studies with empirical data. However, review articles, editorials, and conference abstracts were excluded from this review.

Search strategy

The search strategy was developed by the first author and then reviewed by the other two authors (Additional file 2). On June 13, 2024, the first author searched using seven selected databases: Scopus, ProQuest, Web of Science, Embase, PubMed, MEDLINE, and CINAHL. The search logic and terms can be found in Table 1.

To minimize the risk of overlooking relevant studies, our search terms were primarily focused on two main categories: “caregivers” and “person-environment fit.” The research team recognized the considerable variation in terminology for both formal and informal caregivers, as well as the diverse categories and occupational titles associated with formal caregiving across different regions. After conducting preliminary searches, we decided to substitute specific caregiver titles with broader terms related to “caregiving” and “nursing” to ensure a comprehensive exploration of the literature in this relevant field. We did not specify the care recipients as “older adults” in the main search, but we verified this during subsequent screening. Moreover, during the full-text screening process, two reviewers manually searched through the bibliographies and related recommendations of the eligible articles to identify further articles that may not have been covered.

We limited the publication dates of this review to between 2000 and the present. This choice is driven by the growing global focus on elderly care issues since 2000. In that year, the WHO released “Towards an International Consensus on Policy for Long-Term Care of the Ageing,” emphasizing caregivers’ roles, responsibilities,

Table 1 Search logic and terms

Caregiver OR	AND	Person-environment fit OR
"caregiving"		"person-environment*"
"caregiver*"		"person and environment"
"carer*"		"PE fit"
"care giver*"		"P-E fit"
"care"		"competence-environment*"
"caring"		"demands-abilities"
"nurse*"		"needs-supplies"
"nursing"		"person-job"
		"person-organization"
		"person-group"
		"person-supervisor"
		"person-vocation"
		"environment fit"
		"supplementary fit"
		"complementary fit"
		"fit perspective"
		"fit theory"
		"fit model"

and rights [5]. This publication led to more research into the conditions and needs of both formal and informal caregivers for older adults. Through this scoping review, our goal is to gain a thorough understanding of research on caregivers' person-environment fit in the 21st century.

Study selection

All retrieved articles were exported to Covidence [27], where duplicate records were automatically and manually excluded. Subsequently, two independent reviewers screened the titles and abstracts based on the inclusion criteria. The interrater reliability was moderate [28], as assessed by Cohen's kappa ($\kappa=0.636$, 95% CI 0.49–0.79). Full-text screening was also conducted by two reviewers, demonstrating a strong interrater reliability ($\kappa=0.842$, 95% CI 0.63–1.00). Any disagreements in the screening process were resolved through discussions between the two reviewers. If consensus could not be reached, a third reviewer was consulted for further resolution.

Due to the exploratory and comprehensive nature of the scoping review method, critical appraisal or risk of bias assessment is generally not performed in such reviews [23].

Data extraction and synthesis of results

Data extraction is an iterative process aimed at identifying the most pertinent data for analysis in relation to the research theme and questions [25]. Following the guidance proposed by Pollock et al. [29], our research team developed a standardized data extraction form. This form included the year of publication, author(s), journal, country/region, research purpose, study design, sample, theoretical basis, measurements, and key findings. Two reviewers independently used this form to extract relevant data from the selected articles and store it in Microsoft Excel (Microsoft 365 version). After the extraction, the reviewers consolidated the data through discussions, determining which data to retain and supplement, and the charting content was reviewed by a third reviewer.

The descriptive findings of the review were presented in a narrative format, accompanied by visual tables. First, we summarized the selection process and characteristics of the included articles. Next, we employed an inductive approach to synthesize the extracted data into four overarching themes, which were developed during the analysis: theoretical frameworks, dimensions and types, assessment tools, and associated factors. We also discussed the similarities and differences between formal and informal caregivers within each theme.

Results

Study selection and characteristics

A total of 4264 studies were found through electronic searches across seven databases. After removing

duplicates and records that did not meet the criteria, and adding one manually searched eligible record, a total of 15 articles were included in this scoping review. The PRISMA flow chart presented the entire identification and selection process (see Fig. 1).

The general characteristics of each article are shown in Additional file 3. Among the 15 included articles, nine studies focused on formal caregivers, published between 2010 and 2024 [10, 16, 30–36]. Six studies centered on informal caregivers, and their publication dates ranged from 2004 to 2024 [37–42]. Formal caregivers involved employees in aged care facilities and nursing homes, such as geriatric nurses and nursing assistants [10, 16, 30–36]. Informal caregivers mainly comprised older adults' relatives, including spouses and adult children [37–42].

The studies included in the review cover regions in Europe, North America, Asia, and Oceania. The majority of the studies were conducted in high-income industrial economies, as classified by the United Nation [43]: the USA ($n=5$) [30, 31, 37, 39, 41], Australia ($n=2$) [16, 33], Germany ($n=2$) [10, 35], the Netherlands ($n=1$) [32], Taiwan Province ($n=1$) [34], Portugal ($n=1$) [38], England ($n=1$) [40], and Russia ($n=1$) [42]. Other studies took place in Mainland China ($n=1$) [36] and Thailand ($n=1$) [38]. Eleven studies used person-environment fit as the basis for hypotheses or analytical framework [10, 16, 30–36, 38, 41], three employed it as a theoretical foundation for assessment tools and interventions [37, 39, 40], and one article identified person-environment fit as one of the themes derived from qualitative analysis [42]. Most studies utilized quantitative methods ($n=10$) [10, 16, 30–32, 34–37, 41], four used qualitative approaches [33, 38, 40, 42], and one employed a mixed-methods design [39]. Regarding study design, nine studies were purely cross-sectional [16, 30]–[31, 33, 34, 36, 38, 40, 42], three involved longitudinal design [32, 35, 41], one utilized a pretest-posttest control group design [37], and two studies incorporated multi-stage research designs [10, 39]. The sample sizes for quantitative and mixed methods studies ranged from 70 to 4632, while qualitative studies had sample sizes of 20–108. Females accounted for 65% of the total sample, dominating both formal and informal caregiving roles based on reported gender ratios. Four studies gathered data from both caregivers and care recipients [37, 39–41], while the rest gathered data solely from the caregivers.

The academic fields of the first authors of the included articles are depicted in Fig. 2. Scholars studying formal caregivers primarily have backgrounds in management and psychology. They applied the person-environment fit theory to understand the work capacity, job satisfaction, and attitudes of care providers. In contrast, scholars who study informal caregivers come from the health-care, sociology, and social work fields. They primarily

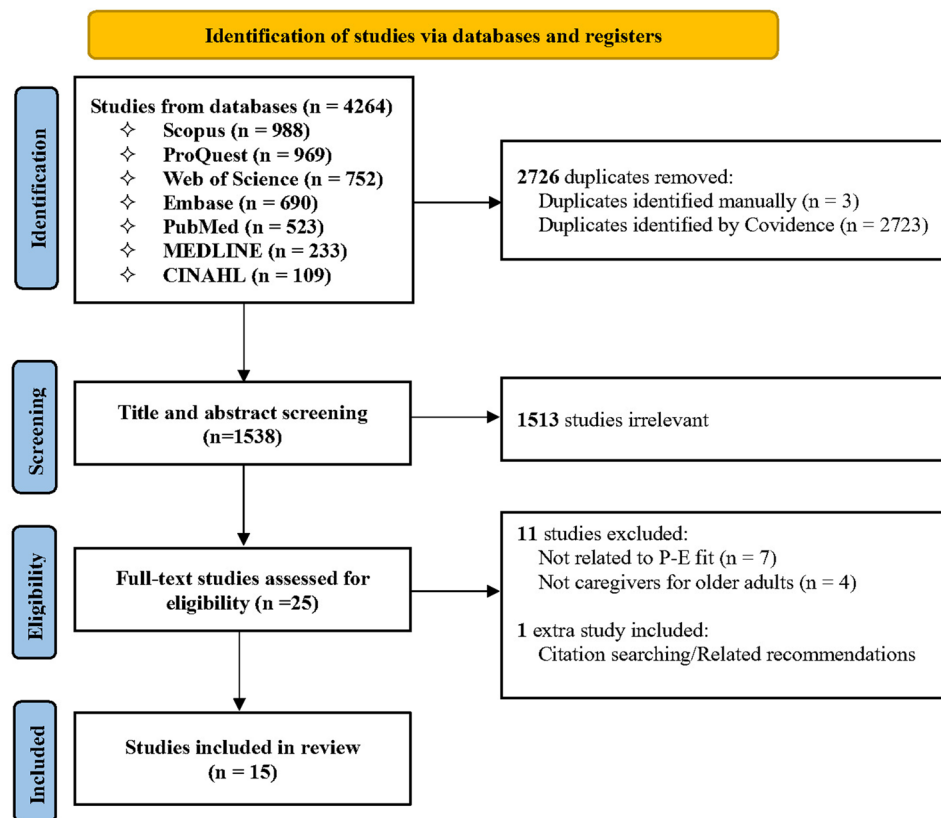


Fig. 1 PRISMA flow diagram of included studies from search to inclusion

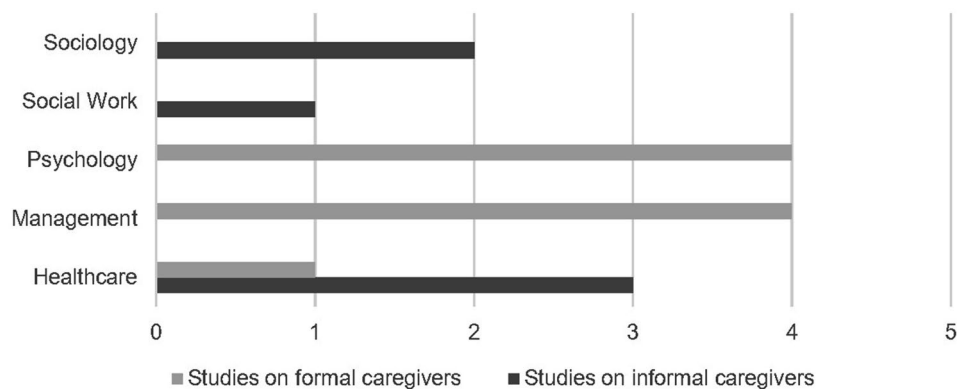


Fig. 2 Academic fields of the first authors of the included articles

focused on the challenges faced by informal caregivers. Most articles (60%) were published in Q1 journals, which were ranked in the top quartile based on Journal Impact Factor (JIF), and these articles covered interdisciplinary areas (Table 2). Studies on formal caregivers were mainly published in the categories of management and nursing, while those on informal caregivers were published in sociology and rehabilitation.

Theoretical frameworks for caregivers' person-environment fit

The "person-environment fit" was theoretically conceptualized, and most of the articles (93%) have reported the theoretical framework used in their research. The findings indicated a notable distinction in the theoretical focus related to formal and informal caregivers: Formal caregivers employed by caregiving institutions were often analyzed from human resource and organizational management perspectives [16, 30–36]. In contrast, informal caregivers for older adults typically undertook their

Table 2 JIF quartile of published journals

Theme	Citations	JIF quartile of published journal
Formal caregivers	Schmidt (2010)	Q1 - NURSING
	Ren (2013)	Q1 - ETHICS; Q2 - BUSINESS
	Ren and Hamann (2015)	Q3 - INDUSTRIAL RELATIONS & LABOR; Q4 - MANAGEMENT
	Boon and Biron (2016)	Q1 - SOCIAL SCIENCES, INTERDISCIPLINARY; Q2 - MANAGEMENT
	Weale et al. (2017)	Q3 - INDUSTRIAL RELATIONS & LABOR; Q4 - MANAGEMENT
	Weale et al. (2019)	Q1 - NURSING
	Chang et al. (2021)	Q1 - PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH
	Rahnfeld et al. (2023)	Q2 - GERONTOLOGY
	Wu et al. (2024)	Q1 - NURSING
Informal caregivers	Dooley and Hinojosa (2004)	Q3 - REHABILITATION
	Rosenberg et al. (2009)	Q1 - SOCIOLOGY; Q2 - HEALTH POLICY & SERVICES
	Keglovits et al. (2015)	Q1 - REHABILITATION
	Whitehead and Golding-Day (2019)	Q1 - SOCIAL WORK; Q2 - PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH
	Hoffman et al. (2019)	Q2 - NURSING
	Ermoshkina (2024)	Q2 - WOMENS STUDIES; Q3 - GERONTOLOGY

Note: The Journal Impact Factor (JIF) quartiles listed are based on the rankings at their publication years, as reported in the Journal Citation Reports (<https://jcr-clarivate-com.eproxy.lib.hku.hk/jcr/home>)

responsibilities out of traditional filial piety or voluntary commitment, so research on them was primarily based on environmental gerontology perspectives [37, 38, 40–42].

Theories for formal caregivers’ person-environment fit

This section summarizes the theories applied to analyze the person-environment fit of formal caregivers, focusing on the following five sub-theories or analytical models:

Person-organization (P-O) fit [44] and *person-job (P-J) fit* [45] are specialized theories that have emerged from the person-environment fit theory. The P-O fit was used in six studies to understand the interactive and adaptive process between formal caregivers and their organizations [10, 30–33, 35]. Organizations desire committed employees who can meet job requirements and adapt effectively, while caregivers look for organizations that can effectively utilize their skills and fulfill their needs [46]. As for P-J fit, four studies based on this theory discussed whether the nursing staff’s abilities and knowledge match the requirements of caregiving roles, as well as whether their salary and sense of achievement meet their expectations [32–34, 36].

The motivation-hygiene theory divides factors affecting the job satisfaction of formal caregivers into two groups [47]: motivators and hygiene factors. Motivation perceptions refer to aspects directly related to the job itself, such as welfare benefits, job challenges, promotion opportunities, and the sense of achievement, which influence intrinsic satisfaction. Hygiene perceptions highlight the work environment, including company policies, occupational protection, and relationships with employers and colleagues, which affect extrinsic satisfaction. The theory

indicates that the presence of motivators can inspire employees’ enthusiasm, while the absence of hygiene factors may directly lead to job dissatisfaction [48]. Two studies incorporated this theory as an important supplement to the person-environment fit theory, providing insights into the specific dimensions of the interaction between care workers and their work environment [34, 36].

The theory of work adjustment (TWA) proposes that there is a continuous interaction between workers and their environment, known as “work adjustment” [49]. It has two key concepts: “satisfactoriness” and “satisfaction”. “Satisfactoriness” refers to the degree to which an individual meets the job’s requirements, while “satisfaction” indicates how well the job fulfills the person’s expectations. Applying the TWA theory can help researchers better understand how staff in elderly care organizations respond to their work environment [32].

The attraction-selection-attrition (ASA) model [50] suggests that individuals are always attracted to organizations that align with their personal values and interests. Meanwhile, organizations tend to select candidates whose knowledge, skills, and abilities match those of their current employees during the hiring process. Individuals who struggle to adapt to the organizational environment may quit their jobs. The ASA model emphasizes the supplementary fit aspect of the person-environment fit theory, stating that through the processes of attraction, selection, and attrition, the homogeneity among the organization’s members is enhanced, which further shapes the organizational culture. One study used this theory to underscore the importance of the value congruence between care workers and their organizations [30].

The *work-life interface model* extends the person-environment fit theory, focusing on the balance and harmony between formal caregivers' work and personal lives [51]–[52]. This model goes beyond the person-environment fit theory to include person-household fit and person-leisure fit, offering a more comprehensive perspective for analyzing care workers' work psychology and behavior, thereby enriching the meaning of the "environment" [16].

Theories for informal caregivers' person-environment fit

This section presents the theoretical models used to analyze the person-environment fit of informal caregivers, including the man-environment transactional model and the person-environment-occupation model.

The *man-environment transactional model* is the origin of the person-environment fit theory in the field of environmental gerontology [53]. This theory constructs an analytical framework from two dimensions: personal competence (PC) and environmental press (EP). The interaction between the individual and the environment is externally presented as adaptive behavior and stimulates internal affective responses. It is within the adaptation level when PC and EP are relatively matched, but an imbalance between the two may lead to negative impacts. Four studies on informal caregivers of older adults utilized this classic theory to analyze the barriers faced in the physical environment and the health risks encountered by informal caregivers during the caregiving process [37, 38, 40, 41].

The *person-environment-occupation (PEO) model* [54] further develops the person-environment fit theory. Occupation is defined as the ordinary and familiar things that people do every day purposefully, and occupational performance refers to the dynamic experience of a person engaged in purposeful activities and tasks within an environment [54]. The model assumes that its three main components (person, environment, occupation) interact continually across time and space in ways that increase or decrease their congruence. The greater their overlap or fit, the more harmoniously they interact. Therefore, the outcome of greater compatibility is represented as optimal occupational performance. Interventions can improve the positive aspects of the environment or enhance the person's abilities, ultimately preserving or enhancing occupational performance. This model offers clear directions for interventions that support informal caregivers [40].

Dimensions and types of caregivers' person-environment fit

Two fundamental dimensions

The person-environment fit has two fundamental dimensions that are explored in both formal and informal caregiver research. One is the *demands-abilities (D-A) fit*, which can be found in 10 identified studies. The D-A fit emphasizes whether caregivers possess the necessary knowledge and skills to meet the expectations of the care environment [55]. The needs of the care recipients serve as the main source of environmental expectations for caregivers, and they represent the primary demand that informal caregivers need to manage [38]. In contrast, formal caregivers are in a dual role as both employees of an organization and practitioners of elderly care. Their priority is to complete the tasks assigned by the organization, some of which are consistent with the needs of the care recipients, while others may not [10]. Therefore, the D-A fit for formal caregivers can be described explicitly as "job demands-work abilities fit" [16], while for informal caregivers, it can be viewed as "caregiving tasks-caregiving competencies fit" [38].

The other dimension discussed in 11 articles is the *needs-supplies (N-S) fit*, which examines whether environmental resources are sufficient to meet caregivers' needs [55]. Caring for older adults is a demanding task that requires significant time and energy, so caregivers require support and respite to maintain their caregiving role. Formal caregivers' needs are closely connected to the resources offered by their job and the organization. This includes expected salaries, job security [34], flexible working arrangements [33], recognition from supervisors [32], and access to professional development opportunities [36]. However, Informal caregivers rely on a broader range of resources that can vary greatly from one individual to another [38]. These resources can include assistance from family and friends and services provided by occupational therapists and the local community [37].

In summary, all types of person-environment fit are based on a detailed examination of the D-A fit and the N-S fit. Specifically, the review of existing literature reveals several types of fit that are relevant to caregivers (see Table 3), including person-physical environment fit, person-interpersonal environment fit, value fit, goal fit, and work (caregiving)-life fit.

Five types of fit

Person-physical environment fit. Whether caregivers are informal or formal, their compatibility with the physical environment is a vital assessment criterion. The physical environment refers to the accessibility, comfort, and safety of the caregiving spaces, including the facilities used by caregivers and the availability of rest areas [16]. Six studies have discussed the issue of caregivers'

Table 3 Dimensions and types of P-E fit in the included articles

	Dimensions		Types				
	Demands-abilities fit	Needs-supplies fit	Person-physical environment fit	Person-interpersonal environment fit	Value fit	Goal fit	Work (Caregiving)-life fit
Schmidt (2010)	+					+	
Ren (2013)	+				+		
Ren and Hamann (2015)	+				+		
Boon and Biron (2016)	+	+		+	+		
Weale et al. (2017)	+	+					+
Weale et al. (2019)	+	+		+			+
Chang et al. (2021)	+	+					
Rahnfeld et al. (2023)		+	+		+	+	
Wu et al. (2024)	+	+					
Dooley and Hinojosa (2004)		+	+				
Rosenberg et al. (2009)	+	+	+				
Keglovits et al. (2015)		+	+				
Whitehead and Golding-Day (2019)		+	+				
Hoffman et al. (2019)	+			+			
Ermoshkina (2024)		+	+		+		

incongruence with their environment. For example, traditional housings without elevators and age-friendly bathrooms pose significant difficulties for informal caregivers assisting older adults with daily activities, such as moving around and maintaining hygiene [39, 40, 42]. Meanwhile, researchers also emphasized the importance of ensuring the safety of the caregiving environment and providing a space for caregivers to take a break. Improving safety to reduce the risks associated with caregiving can alleviate the psychological burden on caregivers [37, 38]. An available respite space can help caregivers cope with the sense of overwhelm from the continuous and long-term interaction with their care recipients [42].

Person-interpersonal environment fit. In person-environment fit theory, people apart from caregivers are also components of the environment [56]. Two studies have shown that positive relationships between formal caregivers and their colleagues and supervisors can enhance their perceived adaptability and are associated with higher job performance [16, 32]. Additionally, the fit with the care recipient becomes a crucial type in the caregiver’s person-environment fit, especially for informal caregivers. A longitudinal study revealed the interdependence between spouse caregivers and care recipients, indicating that poorer health of the care recipient significantly increased the health risk of family caregivers [41].

Value fit. Values fit was examined in four studies to indicate the alignment of a caregiver’s values with the values and cultural practices of their environment [57]. In the professional field, this is reflected in how formal caregivers support the organization’s mission and perceive their

values to align with the organization’s [30–32]. In residential settings, informal caregivers are influenced by the social norms of their community. For instance, in some regions, it is considered a cultural obligation and moral duty for adult children to care for their aging parents, while hiring domestic workers is a condemned action that implies that the children are ungrateful and unreliable [42]. Consequently, mandatory caregiving responsibilities and unshared caregiving tasks may lead to a misfit between family caregivers and their social values.

Goal fit. In two studies, “goal fit” was measured to determine if formal caregivers’ goals aligned with those of their organizations. Schmidt [10] investigated the discrepancy between nursing staff’s personal goal prioritization and their perception of the organization’s goal ranking. The study found that nursing staff prioritize caregiving as their top goal, while the organization places a greater emphasis on cost-effective objectives. Such goal misfits can trigger caregivers’ exhaustion and leave intentions [35].

Work (Caregiving)-life fit. The work-life fit was mentioned in two studies, and it focuses on the match between formal caregivers’ work and non-work domains. Because formal caregivers work in caregiving, so this type can also be interpreted as a “caregiving-life fit.” Research has shown that this kind of fit impacts caregivers’ capacity to work [33] and their commitment to remaining involved in caregiving [16].

Assessment of caregivers' person-environment fit

The assessment tools for evaluating the person-environment fit are significantly different between informal and formal caregivers in the existing literature. Most studies on informal caregivers used semi-structured interviews to help them share their experiences and feelings [38, 40, 42]. Only one article described a professional assessment tool named "The In-Home Occupational Performance Evaluation for Providing Assistance (I-HOPE Assist)" [39]. The tool covers self-assessment for caregivers and an assessment conducted by occupational therapists. It can help the occupational therapist construct a follow-up intervention program and get a comprehensive understanding of the caregiver's person-environment fit, but the disadvantage is that the process of using this tool is complicated and requires the participation of professionals in the observation part.

Eight out of nine studies on formal caregivers utilized different measurements to collect quantitative data on their person-environment fit. Three of them use standardized scales. One is the Perceived Fit Scale proposed by Cable and DeRue [58], which included nine questions across three dimensions: "person-organization fit," "needs-supplies fit," and "demands-abilities fit." This 7-point scale is self-assessed by caregivers, where a higher score indicates a better fit. Additionally, the Work Organization Assessment Questionnaire (WOAQ), which consists of 28 questions across five dimensions [59], was also used to measure the P-O fit of care workers. This 5-point scale allowed formal caregivers to report their perceptions of the quality of their relationship with their manager, reward and recognition, workload issues, relationships with colleagues, and the quality of the physical environment [16]. Moreover, Chang, Yeh [34] applied a Job Competency Scale to investigate the D-A fit of nursing assistants.

The other five studies developed specific questions and methods based on theories. For example, Rahnfeld, Wendsche [35] created four items represented "value congruence," "goal congruence," "needs-supplies fit," and "personality-climate fit" for nurses to choose from. Ren [30] focused solely on "value congruence," designing one or two questions to inquire about the perspectives of formal caregivers [31]. Schmidt [10] concentrated on "goal congruence," using a goal ranking comparison method. Wu [36] focused on "person-job fit," asking formal caregivers to estimate the relevance of their previous experience to their current job.

Factors associated with caregivers' person-environment fit

The included studies showed that the person-environment fit of formal and informal caregivers was related to their own well-being, commitment to care, and quality of care.

Seven articles indicated that the person-environment fit was associated with the physical and mental health of both formal and informal caregivers. When caregivers can effectively balance their caregiving duties with their health needs, they are better able to maintain their well-being [33]. However, when the care recipient is in poor condition, the limited time and energy of the caregiver can make it hard to fulfill caregiving responsibilities while also taking care of themselves, leading to tension and an increased risk of hospitalization or becoming bedridden due to illness [41]. Additionally, incongruence with the environment may significantly increase exhaustion, emotional detachment, and psychosomatic disorders [10, 42], while a higher level of fit can help reduce symptoms of burnout [35]. When the caregivers' needs are met by their environment, their feelings of fear and anxiety are alleviated [40], and they experience less caregiving burden [37].

In eight studies, caregivers' person-environment fit was found to be closely correlated with their commitment and sustained effort in caregiving. This correlation is particularly pronounced among formal caregivers [31], where a positive person-environment fit is linked to a heightened sense of commitment and a greater willingness to persist in the caregiving role [16, 35, 36]. It has been shown that formal caregivers who experience a strong alignment with their environment reported higher levels of satisfaction [33] and self-efficacy [34]. In contrast, those who perceive a misfit between their abilities and job demands [32], or a divergence between their values and the organization's objectives are more inclined to leave their posts [30].

Moreover, seven studies have confirmed that the fit between caregivers and their environment directly affects the quality of care and the quality of life of older adults [37, 38, 42]. When the caregiving environment is less obstructive and more supportive, informal caregivers can feel more confident in handling various challenges, leading to a smoother caregiving process [39, 40]. In nursing facilities, care workers who are well-suited to their work environment tend to have better work ability [16], stay in their positions for longer periods, and gain a deeper understanding of residents' preferences. This enables them to provide higher-quality personalized care services [33].

Discussion

This scoping review integrates the theoretical foundations, research designs, and main findings from existing literature on the person-environment fit related to caregivers of older adults. It aims to clearly present the current research status on this topic and identify gaps in the literature. The review covers evidence from 15 published articles and is the first to systematically examine

and compare person-environment fit for both formal and informal caregivers. This contributes to expanding the knowledge base for studies focused on caregivers of older adults.

The first question of this review is to examine how previous studies have investigated the person-environment fit of caregivers. This review evaluated methodologies used in previous studies and identified theories related to person-environment fit. In terms of methodology, various data collection methods were employed, including qualitative approaches like semi-structured interviews [33], and quantitative methods that utilized questionnaires and scales [32]. Scholars also adopted a range of research designs, including cross-sectional, longitudinal, pretest-posttest control group designs, and multi-stage designs.

Person-environment fit is a comprehensive and dynamic perspective encompassing multiple dimensions [20]. Specifically, the findings of this review indicate that the environment in the caregiving context is complex and multifaceted. It includes individuals who interact directly with caregivers [36, 41], such as care recipients, supervisors, and colleagues, as well as the physical and cultural environments of their homes, communities, or organizations [30, 40]. Most researchers have concentrated on one or more specific aspects of the formal or informal caregivers' environment to examine how well caregivers fit into these aspects and to further explore the relationship between this fit and other influencing factors.

Moreover, the extent of the person-environment fit experienced by caregivers is dynamic. Longitudinal studies showed that as care recipients' health declined or caregiving demands increased, caregivers may find it increasingly difficult to meet those tasks, resulting in a decrease in their person-environment fit [41]. Conversely, when caregivers perceived an enhancement in supportive resources—such as positive relationships with leaders—their person-environment fit tended to improve [32]. Intervention studies have also demonstrated that effective strategies, like housing modifications and skills training, can significantly enhance the fit for caregivers [37]. These interventions were based on the core principles of person-environment fit theory, which aimed to promote congruence by reducing environmental pressures and enhancing individual competencies [38].

The second research question of this review is to identify the similarities and differences between studies on formal caregivers and those on informal caregivers. Both types of studies shared fundamental assumptions in their theoretical frameworks, particularly concerning how personal attributes aligned with environmental characteristics in terms of demands-abilities fit and needs-supplies fit. However, the specific theories used in the studies were significantly different. Research on formal caregivers

predominantly adopted a management perspective and was guided by a series of established theories, such as the motivation-hygiene theory [36], the theory of work adjustment [32], and the attraction-selection-attrition model [30]. Scholars have already developed several standard analytical frameworks to examine formal caregivers' person-environment fit in the workplace, including value fit, goal fit, person-supervisor fit, and more [10, 31]. In contrast, articles about informal caregivers primarily utilized the man-environment transactional model from environmental gerontology [37]. This model was originally designed to assess how well older adults fit within their environments and has since been adapted for studies on their informal caregivers [53]. Due to the lack of a consistent and comprehensive theoretical framework, the content covered in these studies was relatively superficial and fragmented, focusing mainly on their fit with the physical environment [40].

The third research question explores the relationship between caregivers' person-environment fit, their personal well-being, and the quality of care. This review finds that better person-environment fit is associated with improved physical and mental health for caregivers [33], and low fit often leads to higher levels of strain, exhaustion, and burden [35]. Additionally, person-environment fit impacts the sustainability of caregiving. Individuals with a high person-environment fit show a stronger commitment to caregiving and a lower willingness to leave their caregiving roles [30]. Finally, caregivers with high person-environment fit tend to possess better caregiving abilities, effectively utilize resources in their environment, and maintain a balance in their daily lives, resulting in higher life satisfaction for both caregivers and older adults [16].

Theoretical framework for analyzing informal caregivers' person-environment fit in the caregiving context

One of the objectives of this study is to identify and address gaps in existing theoretical models. The findings indicate that there are many theories that support empirical research on formal caregivers. However, a systematic analytical framework specifically designed to assess the person-environment fit of informal caregivers is still absent. Therefore, we propose a theoretical model for examining informal caregivers' person-environment fit, building on the analytical framework used for formal caregivers and incorporating existing research on informal caregiving. As shown in Fig. 3, caregivers operate within the "interpersonal," "physical," and "cultural" environments. The double-headed arrows representing "fit" encompass both the demands-abilities fit and needs-supplies fit dimensions of the person-environment fit model [19]. These illustrate how a caregiver's abilities should match the environment's demands and how

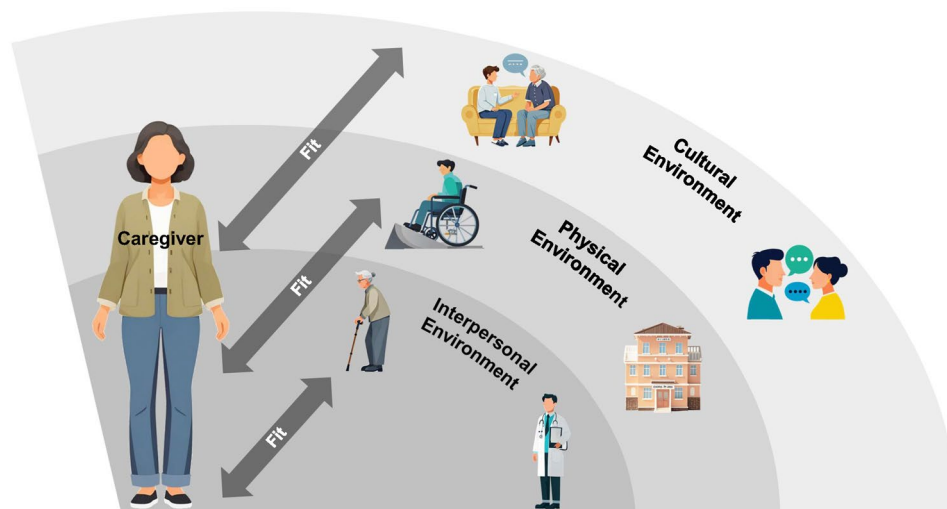


Fig. 3 The theoretical model of person-environment fit for informal caregivers

the environment's resources should meet the caregiver's needs.

The caregiver-interpersonal environment fit is the most direct type of fit for informal caregivers, which emphasizes the interaction and compatibility between caregivers and significant others [41, 42]. Unlike formal caregivers who are managed by organizations, informal caregivers are primarily responsible for their care recipients, making the caregiver-care recipient fit the most central and important element of their person-environment fit. Apart from that, the dynamics between caregivers and family members, healthcare professionals, and others also influence the caregiving process [7]. If the caregiver faces challenges in balancing relationships with these individuals or if conflicts arise, it can negatively impact their perceived fit and hinder their ability to perform caregiving tasks effectively [52].

The caregiver-physical environment fit refers to the extent to which informal caregivers adapt to the community and residential facilities available to them during the caregiving process. The level of aging-friendliness in the physical environment largely determines the difficulty of caregiving activities [60]. A high caregiver-physical environment fit means that the safety, convenience, and accessibility of environmental facilities can well meet the needs of both the caregiver and the care recipient. Additionally, it provides caregivers with sufficient space for respite.

Moreover, the caregiver-cultural environment fit is an extension of value fits [30]. It not only refers to the alignment between personal attitudes and cultural beliefs but also examines the health and social care ecology, communication norms, and social support systems. For example, various societal standards and moral norms exist within caregivers' environments, such as expectations around "who should take on the responsibility of care" and "how

much care should be provided." When caregivers recognize and fulfill these values, their sense of role recognition increases. However, if they disagree with these norms, they may face value conflicts and social pressures [42].

Although the three types in the model are arranged from near to far, this does not imply that their impact on the caregiver's person-environment fit gradually diminishes. In fact, these fits interact dynamically and can change over time. A lack of fit in one area can lead to a collapse of the entire fit, while improvements in one area can enhance overall stability. For example, if a caregiver fails to adapt to local traditional values, their behavior and attitude will affect their relationships with the care recipient and other family members. This situation can shift from cultural misfits to interpersonal misfits [42]. Conversely, when a caregiver improves their match with the physical environment—such as home modifications—their caregiving effectiveness and abilities are enhanced, leading to a better caregiver-care recipient fit [40].

It is worth noting that we have used the term "caregiver" instead of "person" in the category description of this framework. This choice underscores that the framework is specifically designed to analyze the person-environment fit in caregiving contexts. This distinction is important because informal caregivers may have additional roles and responsibilities beyond their caregiving duties, and the fits in other contexts may differ. In summary, this model captures the holistic and dynamic nature of person-environment fit theory while integrating the realities of informal caregiving, thus offering a promising framework for analyzing the experiences of informal caregivers.

Literature gaps and future directions

There is a lack of research systematically examining caregivers from the perspective of person-environment fit, and even fewer studies that prioritize the well-being of caregivers themselves. Although studies on paid caregivers in institutions addressed employee welfare, the primary motivation of the authors was to enhance organizational benefits [34–36]. These studies focused on examining the impact of person-environment fit on employee retention, work attitudes, and job performance [16, 36]. Similarly, most studies on informal caregivers also focused on improving services for care recipients [40]. However, caregivers themselves are a high-risk and vulnerable group [61–63]. The long-term emotional and physical demands of caregiving tasks can negatively impact their health, and a care recipient-centric perspective frequently overshadows caregivers' own needs and vulnerabilities [7, 61, 63]. Therefore, we advocate for more research that adopts a caregiver-centered view to explore the relationship between caregivers' well-being and their person-environment fit, particularly in relation to factors such as self-rated health, stress, depression, and life satisfaction.

The foundational theories of caregivers' person-environment fit need further development, especially for informal caregivers. Although the theory of person-environment fit has gradually been refined, some middle-range theories are needed to better align it with the caregiving context. The theoretical framework of person-environment fit for informal caregivers proposed above is an initial attempt, and further empirical research can be conducted to test and refine this framework. More theoretical discussions on this topic are also expected to be published to deepen the understanding of caregivers' person-environment fit and to guide related research.

As for the methodology, while qualitative methods deeply explore and interpret caregivers' experiences, they often lack generalizability in their findings. Rigorous quantitative research methods can provide researchers with greater opportunities to capture a broader range of caregivers' person-environment fit levels and conduct more systematic analyses of the factors related to them. The findings of this review indicate that studies using validated assessment tools to measure caregivers' person-environment fit are limited, with only one article utilizing the theoretically developed standard scale, the "Perceived Fit Scale" [32]. Therefore, to advance quantitative research in this field, it is essential to develop and validate more caregiver-reported person-environment fit scales based on theoretical frameworks. Additionally, researchers should consider the dynamic nature of person-environment fit [20], as existing studies are largely cross-sectional, making it difficult to demonstrate the dynamic changes in caregivers' fit or to conduct causal

inference analyses. Future research could adopt more longitudinal designs to track the trajectory of caregiver person-environment fit changes, thereby providing valuable insights for intervention practices.

Strengths and limitations

The articles included in this review cover a wide range of content and utilize various research designs, allowing us to comprehensively understand caregivers' person-environment fit in the 21st century. The literature selection process was rigorous, followed the registered research protocol, and involved dual screening at all stages.

This review also has some limitations. First, it only includes peer-reviewed journal articles, which may lead to the exclusion of relevant studies. However, the selected articles have already provided substantial evidence and presented the theories, methods, and key content of caregivers' person-environment fit research. Future studies may consider incorporating gray literature to enhance the existing findings. Additionally, there is a lack of research on developing countries, particularly in the Asia-Pacific region. This region is experiencing unprecedented aging rates, resulting in a large population of caregivers [64]. The unique cultural contexts of these countries can also influence caregivers' person-environment fit. Therefore, the lack of research in this area constrains the review's scope.

Conclusion

The person-environment fit theory offers a valuable perspective for studying caregivers' experiences. Research has shown a significant correlation between the person-environment fit of caregivers, their personal well-being, and the quality of care they provide. By identifying areas of misfit, we can design intervention programs or adjust organizational environments to better meet the needs of caregivers. Research on the person-environment fit of formal caregivers in institutional settings has a relatively robust theoretical framework and measurement methods. However, studies on informal caregivers are insufficient, lacking clear theoretical guidance and assessment scales. Therefore, it is essential to enhance both theoretical and empirical research on person-environment fit in the informal caregiving context. Specifically, conducting longitudinal quantitative studies will help us gain a better understanding of the dynamic changes in person-environment fit for informal caregivers and its long-term impacts on their well-being.

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

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Author contributions

All authors were responsible for the study's inception and design. YH: conceptualization, methodology, formal analysis, data curation, investigation, visualization, writing original draft, review and editing. VWL: conceptualization, methodology, formal analysis, investigation, project administration, supervision, visualization, funding acquisition, review and editing. WZ: software, data curation, formal analysis, investigation, review and editing. GY: software, data curation, formal analysis, investigation, review and editing. XK: validation, formal analysis, investigation, conceptualization, review and editing. FY: validation, formal analysis, investigation, conceptualization, review and editing. HL: validation, formal analysis, investigation, review and editing. JZ: validation, formal analysis, investigation, review and editing. YZ: validation, formal analysis, investigation, review and editing. WL: validation, formal analysis, investigation, review and editing. SL: validation, formal analysis, investigation, review and editing. All authors read and approved the final manuscript.

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Data availability

The raw data generated and analyzed in the current study are available in the Open Science Framework repository and can be accessed under the "Files" tab on the website (<https://osf.io/yj8c/>).

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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