Factors influencing the formation of balanced care teams: the organisation, performance, and perception of nursing care teams and the link with patient outcomes: a systematic scoping review

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Abstract

Background The composition of care teams is crucial for delivering patient-centered healthcare, yet assembling a well-balanced team remains a challenge. This difficulty stems from the intricate dynamics of team capacity, culture, context, and the demands of the job. The current literature offers limited guidance for decision-makers on how to effectively navigate these dynamics to compose a balanced care team.

Methods We conducted a systematic scoping review of literature spanning from 2009 to 2022. The aim was to identify factors that significantly influence the work environment, team performance, nursing outcomes, and patient outcomes within healthcare settings. Our review focused on extracting and synthesizing evidence to uncover these influencing factors.

Results Our analysis identified 35 factors that play a significant role in shaping the work environment and influencing team performance, nursing outcomes, and patient outcomes. These factors were categorized into nine key domains: workload, leadership, team composition, stress and demands, professional relationships, safety, logistics and ergonomics, autonomy and responsibility, and transparency and task clearness.

Conclusions To improve patient care and nursing job satisfaction, policymakers and decision-makers can consider these influencing factors in the design and management of care teams. The findings advocate for strategic adjustments in these domains to enhance a team's balance. Furthermore, our review underscores the need for further research to fill the identified gaps in knowledge, offering a directive for future studies into optimal care team composition. This systematic approach to team composition can significantly impact patient outcomes and nurse satisfaction, providing a roadmap for creating more effective and harmonious teams.

Keywords Workforce planning, Nursing administration research, Hospital information system, Data-driven healthcare, Work environment, Nursing outcomes, Team performance, Patient outcomes.

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Background

Nursing staff constitute half of the global healthcare workforce. However, there are growing concerns about chronic nursing shortages and high turnover rates in many healthcare organizations. Several countries have reported an increasing gap between the number of practicing nurses and the rising needs of the population due to aging populations and a growing burden of chronic diseases [1–4]. These factors have resulted in a quantitative shortage of nurses, which is further exacerbated by high turnover rates [5], global competition for skilled workers [6], and nurses' growing preferences for alternative jobs [7–9]. In addition, care complexity is increasing due to highly demanding technological innovations [10] and patient-tailored healthcare, which increases the need for qualified and well-trained staff in changing environments [11]. The World Healthcare Organization (WHO) estimated a 7.6 million shortfall in nurses by 2030 [12]. The COVID-19 pandemic proved to be a catalyst for accelerated levels of absenteeism and nurses who permanently leave the profession [13].

Understaffing and suboptimal skill-mix within care teams could result in missed care, adverse patient outcomes including mortality, and failure to rescue [14–17]. The latter also affects nursing staff outcomes such as job satisfaction, potentially leading to increased staff turnover [18, 19].

Attracting and, most importantly, retaining nurses is an important global challenge [20]. Policymakers attempt to address the need for qualified staff by increasing the number of nurses entering the workplace as a first key strategy. However, simply increasing the supply of nurses will be insufficient to address the current staffing problems in healthcare [3, 21]. Previous research has shown that experienced and highly educated nurses are essential to provide high-quality care [22–24]. Therefore, a second and complementary strategy to cope with limited nursing staff is to focus on the composition of care teams and to optimize care through the appropriate allocation of nursing skills across teams. Research has shown that nurses are sometimes overqualified for some tasks, which indicates options for improvement [21].

At this moment, many decision-makers lack the tools to address the complex interactions between a team's capacity and job demands and the role of culture and context. As such, building a balanced team adapted to their specific context and the needs of their patient population is complex, although it improves the quality of care and potentially the retention of experienced staff [20]. In a balanced care team, there is a strategic alignment among the team's capacity, its operational processes, and the demands of care, all aimed at optimizing outcomes for both the team and the patients. This approach underscores the importance of maintaining a crucial equilibrium between the capabilities of the team and their assigned tasks. It ensures that the design of work systems enhances patient safety, promotes the well-being of staff, and boosts organizational effectiveness. By maintaining this balance, balanced care teams contribute to the sustainability of high-quality care and the achievement of positive outcomes for both healthcare providers and patients.

Despite the potential benefits of a balanced care team, there is currently discussion on how to optimally compose such a team or which factors should be taken into consideration. Additionally, the interactions between these factors can be complex and not well understood. By better understanding which factors influence the development of a balanced care team and how the factors interrelate, healthcare organizations can develop more data-driven strategies to attract and retain nurses, improve patient outcomes, and promote job satisfaction among healthcare professionals.

The objective of this systematic scoping review is to comprehensively examine the literature on the elements that contribute to the formation of balanced healthcare teams, guided by Donabedian's model [25] which organizes healthcare quality into three interconnected domains: structure, process, and outcomes. The structure encompasses the characteristics of the healthcare settings and impacts the work environment; the process includes the interactions between patients and providers, reflecting team performance; and the outcomes represent the health effects on patients and nursing staff, aligning with our focus on their respective outcomes. This review aims to explore the interrelationships among the structural conditions of the work environment, the processes of team performance, and the resulting outcomes, offering insights into what could make or break high-performance and balanced care teams and to identify variables that could be effectively utilized in practice to enhance both care quality and workforce stability.

Methods

This systematic scoping review was conducted with the guidance of the Preferred Items in Systematic reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) [26].

Data sources and search strategy

Starting from the definition of balanced working teams outlined in the introduction and guided by Donabedian's model [25], we identified four dimensions to be included in the search query: work environment, team performance, nurse outcomes, and patient outcomes. In this review, "dimensions" refer to broad categories that encapsulate various factors influencing the functioning of balanced care teams. This terminology is intended to

capture the multifaceted nature of these factors, reflecting the broader scope of their impact beyond singular outcomes. By categorizing these aspects as dimensions, we aim to highlight their interconnected roles in shaping the overall performance and effectiveness of healthcare teams, consistent with the holistic approach of the balanced care team framework. In line with PRISMA-ScR guidelines, eligibility criteria were determined by three researchers (SV, FH and PvB) prior to screening. Based on these eligibility criteria and exploratory searches, we defined the queries presented in Fig. 1. We searched for papers in PubMed and ISI Web of Knowledge on factors influencing the work environment on November 9th, 2022. We restricted the search to papers published from June 2009 onward to obtain information related to the current situation in the continuously evolving healthcare system. Original research papers (quantitative, qualitative, and mixed methods) and reviews were included when they focused on factors influencing the organization of nursing care teams on the work environment and/or team performance and/or nurse outcomes and/or patient outcomes. Papers were excluded if they did not concern the organization of care teams, did not discuss influencing factors or if no significant effects were found.

Identification of articles and data extraction

Two researchers independently screened titles, abstracts, keywords, and full texts if necessary to assess the eligibility of the paper (SV and FH). Discrepancies were resolved through discussion with a third reviewer (PvB). During the full-text screening, SV and FH used an electronic matrix to facilitate a structured and systematic extraction of data from each study. The matrix required them to input detailed information about each study, starting with the methodology employed. This included specifying the type of study design (e.g., RCT, cross-sectional, longitudinal), the population studied, and the setting. Next, this process involved identifying the independent variables examined in each study, ensuring a comprehensive understanding of the factors being investigated. Furthermore, our analysis extended to categorizing the impact of these independent variables on the four dimensions of this review: work environment (e.g., the physical work environment, physician–nurse relations, organizational support, etc.), team performance (e.g., teamwork, team efficacy, task performance, etc.), nurse outcomes (any outcome related to the work attitude or behavior of nurses or affiliated staff:, e.g., job satisfaction, burnout, etc.) and patient outcomes (all outcomes that affect patients, e.g., nurse-sensitive outcomes, mortality, etc.). Lastly, the electronic matrix facilitated the recording of exclusion reasons or supported the inclusion decision-making process. The list of influencing factors was iteratively refined during data extraction by employing a thematic combination approach. This method involved grouping individual factors into broader domains based on their thematic similarities or their interconnectedness within the context of the research findings. The iterative nature of this refining process meant that the list of influencing factors was dynamic as we delved deeper into the literature. Discrepancies in the categorization or interpretation of factors were resolved by a third reviewer (PvB), whose role was to provide an additional layer of

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(("team composition"[Tiab] OR ("team"[Tiab] AND "organisation"[Tiab]) OR ("team"[Tiab] AND "factors"[Tiab]) OR "staffing"[Tiab] OR "skill-mix"[Tiab]) AND ("Nursing"[Mesh] OR "care"[Tiab]) AND ("hospital"[Tiab] OR "hospitals"[Tiab] OR "nursing home"[Tiab] OR "nursing homes"[Tiab] OR "residential"[Tiab]) AND ("culture"[Tiab] OR "performance"[Tiab] OR "balance"[Tiab] OR "workload"[Tiab] OR "environment"[Tiab] OR "optimal"[Tiab])) OR (("team composition"[Tiab] OR ("team"[Tiab] AND "organisation"[Tiab]) OR ("team"[Tiab] AND "factors"[Tiab]) OR "staffing"[Tiab] OR "skill-mix"[Tiab]) AND ("Nursing"[Mesh] OR "care"[Tiab]) AND ("hospital"[Tiab] OR "hospitals"[Tiab] OR "nursing home"[Tiab] OR "nursing homes"[Tiab] OR "residential"[Tiab]) AND ("quality"[Tiab] OR "patient safety"[Tiab] OR "adverse event"[Tiab] OR "adverse events"[Tiab] OR "outcomes"[Tiab]))

ISI Web of Knowledge

(((((TI=("team composition") OR TI=(team NEAR/5 organisation) OR TI=(team NEAR/5 factors) OR TI=(staffing) OR TI=(skill-mix)) AND (SU=(Nursing)) AND TS=(hospital OR hospitals OR "nursing home" OR "nursing homes" OR residential) AND TS=(culture OR performance OR balance OR workload OR environment OR turnover OR satisfaction OR burnout OR burn-out OR demand OR demands OR schedule)) OR ((TI=("team composition") OR TI=(team NEAR/5 organisation) OR TI=(team NEAR/5 factors) OR TI=(staffing) OR TI=(skill-mix)) AND (SU=(Nursing)) AND TS=(hospital OR hospitals OR nursing home OR nursing homes OR residential) AND TS=(quality OR "patient safety" OR "adverse event" OR "adverse events" OR outcomes))))

Fig. 1 The search query for the Pubmed and ISI Web of Knowledge databases used on November 9th, 2022

scrutiny and consensus, thereby ensuring the reliability and accuracy of the analysis.

Results

Using the online databases PubMed and ISI Web of Knowledge, we identified 2,394 unique articles published between 2009 and 2022 that matched our search criteria. Based on the screening of the title, abstract and keywords with predefined eligibility criteria, we excluded 1,909 articles. Of the remaining 485 full-text articles, we excluded another 122 for which the topic did not concern the organization of care teams, if no influencing factors were studied, no significant effect was found, or if no full text could be retrieved. Finally, 363 studies were included for data extraction and qualitative synthesis. The PRISMA-ScR diagram is shown in Fig. 2. Due to the large number of included articles, we did not include a citation for every article but provided one reference as an example in the Results section and provided a summary table in Appendix 1 with a complete set of references including study characteristics.

Study setting

Among the 363 included studies, we found that most of the research was conducted in the acute hospital care setting and in residential care (Table 2). A minority of the included papers were carried out in home care (8 articles), revalidation care (9), geriatric care (13) and psychiatric care (18). A descriptive cross-sectional design was used in nearly 70% of studies. In contrast, an experimental study design (RCT, CT) was used in only two included studies. We included 3 meta-analyses and 36 systematic
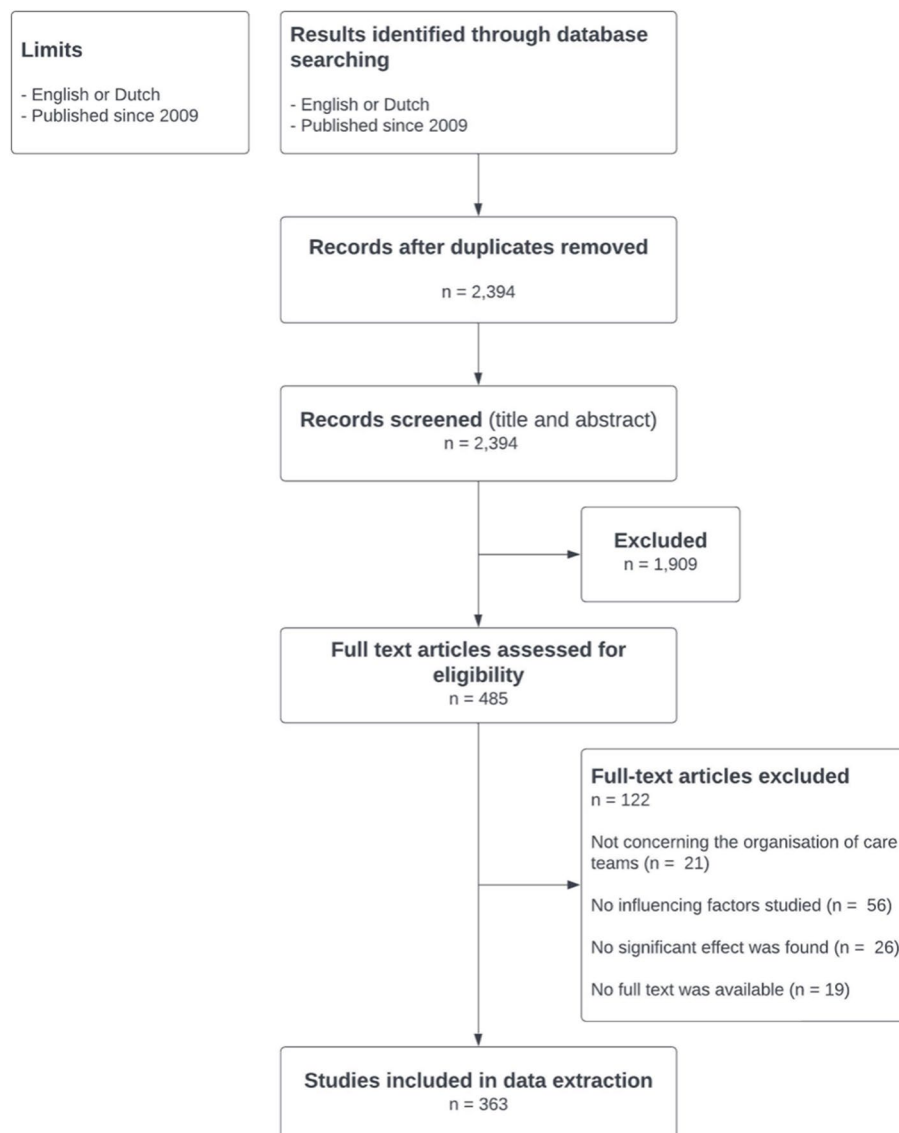
Fig. 2 PRISMA-ScR flow diagram of the scoping review process

reviews using qualitative data synthesis. Most of the literature has focused on nursing and patient outcomes. Table 1 outlies the number of included articles per context, per evidence level and per studied dimension.

Influencing factors

We utilized a matrix to compile a comprehensive list of factors that influenced the nursing team, the work environment, team performance, and patient outcomes. In total, we identified 35 such factors. As shown in Table 2, we classified these factors into nine overarching domains: (1) autonomy and responsibility, (2) leadership, (3) logistics and ergonomics, (4) professional relations, (5) stress and physical demands, (6) team compositions, (7) transparency and task clearness, (8) safety, and (9) workload. Not surprisingly, the domain that has received the most research attention is the workload domain ($n=298$), mostly with a focus on nurse staffing levels ($n=206$). The two other frequently studied domains are leadership ($n=212$) and team composition ($n=171$), the latter with a clear focus on the impact of the educational level of nurses ($n=71$). The least studied domain was that of transparency and task clearness, yet 23 studies have been published in the area. For the three largest domains (workload, team composition and leadership), Fig. 3 displays the number and evolution of published papers over the period between 2009 and 2022 and demonstrates a noticeable rise in the number of papers, particularly since 2019. To improve the readability of the graph, we only included the three largest domains, although we discuss all domains in the main text. In what follows, we will discuss the literature and research findings for each of these nine domains.

Autonomy and responsibility

We found a link in the literature between professional autonomy and educational level, the involvement of direct managers, transformational leadership, and the nurse−physician relationship [27]. Unclear responsibilities were identified as counteractive and researched in combination with team composition and leadership [28]. The papers in this domain focus predominantly on nurse and patient outcomes. Notably, autonomy and responsibility have demonstrated a positive impact on job satisfaction [29].

Leadership

Within this domain, we found papers on transformational leadership. In 68% of the included studies, this was linked with the involvement of direct managers (listening to concerns, acknowledgment of problems, and inspirational leadership) [28]. A management style focused on engaging and empowering nurses has shown a positive effect on both nurse and patient outcomes and has often been studied simultaneously with the involvement of direct managers and transformational leadership [30]. Seven studies found an effect of the conflict management style of the direct managers and the organization on the outcome measures. The impact on organizational decision-making, perceived trust in management and unfair treatment by management were described as important for nursing team outcomes [31] and patient outcomes [30]. Finally, adequate conflict management by the direct manager and a qualified and trusted chief nursing officer (CNO) mostly described the nurse outcomes and team performance.

Table 1 The number of included articles per context, per evidence level and per dimension

	363 full text articles included			
	Acute hospital care	$n=311$		
	Geriatric care	$n=13$		
	Psychiatric care	$n=18$		
	Revalidation care	$n=9$		
	Residential	$n=41$		
	Home care	$n=8$		
Number of included articles per evidence level and dimension				
	Work environment	**Team performance**	**Nurse outcomes**	**Patient outcomes**
Meta-analysis	-	-	2	1
Systematic review	2	4	14	18
Narrative review	1	-	2	6
Experimental design (RCT, CT)	-	1	2	4
Case−control or cohort design	-	4	4	28
Descriptive cross-sectional	23	32	99	149
Qualitative study design	4	4	13	8
Expert opinion	2	-	1	2
Total	**32**	**45**	**137**	**216**

Please note that Studies can be conducted in multiple settings or attribute to multiple dimensions

Table 2 Number of articles confirming the association between the domain or subdomain with one or multiple dimensions

Domains	N of articles[a]	Dimension measures				Aspect
		A	B	C	D	
1. Autonomy and responsibility	48	2	6	26	17	
Professional autonomy	28	1	5	15	11	2
Unclear responsibilities	4	-	1	2	1	2
Lack of control	16	1	-	9	5	2
2. Leadership	212	30	44	145	63	
Involvement of direct managers	69	9	14	46	20	1
Transformational leadership	42	6	12	28	14	2
Adequate conflict management	6	2	3	4	1	2
Qualified and trusted CNO*	5	-	-	5	1	1
Perceived trust in management	15	-	1	12	4	2
Impact in organizational decision making	36	8	7	23	12	2
Leadership focused on nurse engagement	39	5	7	27	11	2
3. Logistics and ergonomics	45	9	8	14	30	
Physical work environment	30	7	1	11	17	1
Lack of- or outdated medical/nursing equipment	15	2	7	3	13	1
4. Relations	52	6	9	29	22	
Relation with patient/family	15	-	2	9	6	2
Physician - nurse relationship	36	6	7	20	16	2
5. Stress and physical demands	73	5	10	57	25	
Moral or physical stress due to patient care/emotional demands	28	1	3	21	7	3
Physical demands	8	2	-	6	3	3
Perceived work-related stress	33	2	7	20	13	3
Benefits and rewards	6	-	-	6	-	3
Work-life balance	4	-	-	4	2	3
6. Team composition	171	15	23	57	94	
Demographics	7	1	2	2	3	1
Supplemental agency (interim) nurses	13	3	1	3	9	1
Nurse educational level (RN, bachelor)	71	4	5	13	49	1
Team "coreness" - right team, right time and place	19	1	3	8	11	1
Team cohesion/climate	37	4	8	18	14	2
Training, education, professional development	24	2	4	13	8	2
7. Transparency and task clearness	23	3	6	9	12	
Useful guidelines or protocols available	5	1	1	1	3	2
Frequent and clear communication	18	2	5	8	9	2
8. Safety	47	6	10	16	34	
Nurses report unsafe staffing situations	33	3	6	12	23	2
Safety culture (no blame)	14	3	4	4	11	2
9. Workload	298	22	24	93	202	
Nurse staffing levels	206	13	19	54	147	1
Support of other services during patient care	8	2	-	5	3	1
Care left undone	34	4	-	12	22	3
Nonnursing taskload	6	1	-	3	4	2
Shift working	29	2	4	15	14	2
Overtime	15	-	1	4	12	3

Aspect of the balanced care team model: 1: capacity; 2: processes; 3: demands.

CNO Chief Nursing Officer, *RN* Registered Nurse, A: work environment, B: team performance, C: Nurse outcomes, D: Patient outcomes

[a]Studies can attribute to multiple domains, subdomains or dimensions

Logistics and ergonomics

This domain covers the lack of (up-to-date) medical and nursing equipment and the physical work environment of nurses. These factors mainly influence patient outcomes, the work environment and nursing outcomes. However, there was one study that found an effect on team performance, where (physical) work organization had a positive influence on team performance and reduced care left
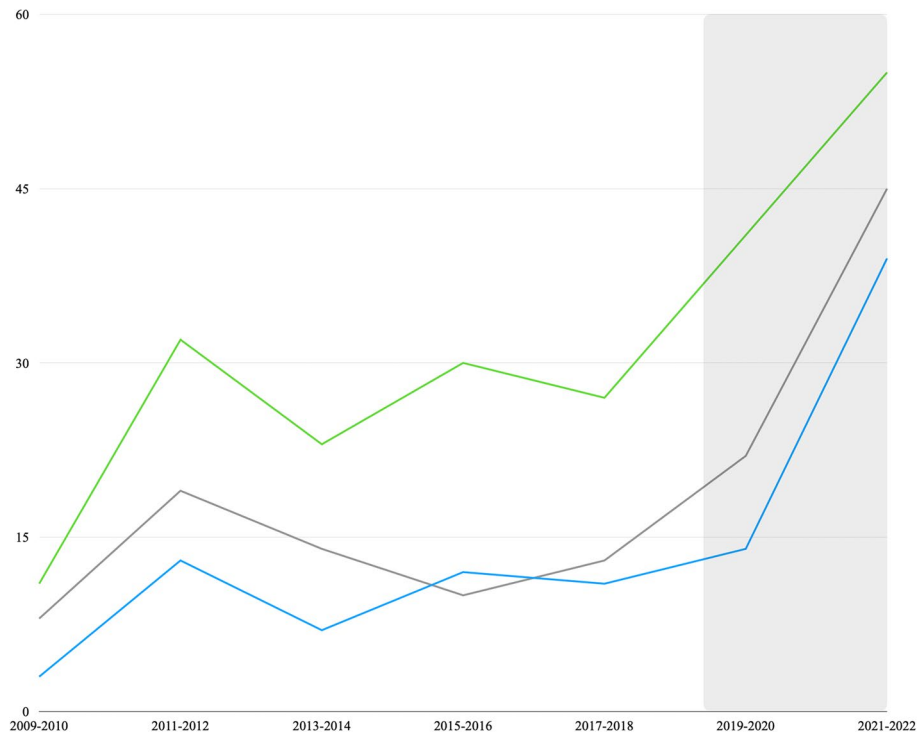
Fig. 3 The number of studies included in select domains over time. Legend: Green: Blue: Leadership; Workload; Grey: Team composition. The gray marked area represents the Covid-19 pandemic

undone [32]. Several studies where logistics and ergonomics were found to have an effect were conducted on job (dis)satisfaction [33] and burnout [34].

Professional relations

Nursing teams encounter many types of interactions and professional relationships. The physician–nurse relationship has been proven to influence all four dimensions, although most studies focus on nurse outcomes. A positive relationship with physicians has a positive impact on nurses' job satisfaction [35] and their intention to leave [35] and reduces burn-out [36], mortality [37] and other outcomes. The relationship between nurses and patients and their families influences both nurse and patient outcomes [38]. Two studies also showed a link with team performance.

Stress and physical demands

All four studied dimensions were significantly linked with perceived work-related stress and moral or physiological stress due to patient care in combination with emotional and physical demands. In particular, nurse outcomes have been described in various nursing contexts [29]. Work-life balance in this domain is considered an influencing factor, for example, the effect of a healthy work-life balance on occupational fatigue [39]. However, work-life balance is also a nurse outcome measure influenced by shift working [39], overtime [40] and lack of

control [27]. Therefore, work-life balance is considered a mediator: shift work, overtime and lack of control influence work-life balance, which in turn influences occupational fatigue. The benefits and rewards nurses receive (e.g., salary) had an impact on job (dis)satisfaction and intention to stay [41].

Team composition

The educational level of nurses within a team had a clear positive effect on patient outcomes and has been researched extensively in acute hospitals and residential care [14]. Some papers have also shown the effect on nurse outcomes [39]. In 31 of the identified papers, the educational level was researched jointly with the nurse staffing level. Team cohesion and climate showed an effect on all four dimensions. It relates to the involvement of direct managers and nurse–physician relationships [42]. In addition, some studies have discussed the impact of team 'coreness', which denotes whether one is in the right team, place, and time [30]. The deployment of supplemental or agency nurses showed a negative effect on patient outcomes in nine studies [43]. Only a small number of studies have investigated the effect of team demographics on patient and nurse outcomes, although they have reported significant effects [44]. Figure 3 shows that the research domain of the composition of care teams is gaining interest in the research community. Especially

since 2019, we can see an increasing number of publications about this topic.

Safety

Nurse-perceived staffing levels (nurse-reported unsafe staffing situations) were reported to impact both patient and nurse outcomes negatively and are influenced by leadership (involvement of direct managers, impact on organizational decisions and nurse engagement) [45], nurse staffing levels [46] and nurse–physician relations [47]. It has been described in two systematic reviews regarding the organizational context of nursing [45, 48]. Safety culture within a nursing team clearly affects patient outcomes [49] as well as other dimensions. There was also a link between safety culture and leadership [50], but we did not find links with the nurse–physician relationship.

Transparency and task clearness

The domain with the lowest number of retrieved studies consists of two influencing factors: frequent and clear communication and the availability of guidelines or protocols. Whether communication is clear and timely has been linked to all four dimensions and is affected by the physician–nurse relationship and the involvement of a direct manager [48]. There was no specific dimension that stood out, given the limited amount of literature on this topic.

Workload

Most retrieved research identified an effect between staffing levels and one or more of the four dimensions. The studies were conducted in all work contexts, and we also included one meta-analysis and 17 systematic reviews. A meta-analysis on nurse staffing and nurse outcomes [51] showed that higher nurse-to-patient ratios were consistently associated with a higher prevalence of burnout, increased job dissatisfaction, and higher intent to leave among nurses. There were disparities in how various papers measured and reported nurse staffing levels, such as the nurse-to-patient ratio, nursing hours per patient day and bed-to-nurse ratio. In 71% of the papers included, there was evidence of the impact of nurse staffing levels on patient outcomes and 26% on nurse outcomes. Shift working influences both nurse and patient outcomes [39] and has a negative impact on nurses' work-life balance. It was often jointly investigated with overtime and nurse staffing levels [39]. The negative effects of workload, shift work and overtime have been shown on patient and nursing outcomes in acute hospitals. High workload also causes care to be left undone, which represents missed, unfinished, or incomplete care, and the effect on patient outcomes is apparent from the literature. As with work-life balance, care left undone is

a mediator between workload (e.g., staffing levels) and patient outcomes [52]. Furthermore, it also has a negative impact on nurse outcomes [41] (e.g., job dissatisfaction) and the nursing work environment [53]. Studies focusing on job (dis)satisfaction and intention to leave found a link with workload and emphasized the benefits and rewards of a balanced workload on nurse outcomes.

Discussion

This systematic scoping review presents an overview of the existing body of knowledge regarding the factors affecting the organization of balanced care teams published between 2009 and 2022. We identified 35 influencing factors that, according to the extant research, have a significant effect on the four dimensions under study, i.e., work environment, team performance, nurse outcomes and patient outcomes. We categorized these factors into nine overarching domains: (1) autonomy and responsibility, (2) leadership, (3) logistics and ergonomics, (4) professional relations, (5) stress and physical demands, (6) team compositions, (7) transparency and task clearness, (8) safety, and (9) workload.

The relationships between the dimensions of work environment, team performance, nurse outcomes, and patient outcomes are inherently complex, and the direction of causality may vary. For example, a supportive work environment can enhance team performance, which in turn positively affects nurse and patient outcomes, demonstrating the bidirectional and dynamic nature of these relationships. Although all four dimensions are important, we know from research that particularly the work environment and team performance seem key to retaining a skilled workforce. Bae et al. [54] showed that turnover has a serious economic impact on hospitals caused by reduced productivity, the need to hire and train new nurses, and the costs associated with vacancies and temporary replacement. Therefore, optimizing the nursing work environment and supporting a team's performance can help retain more experienced nurses in the workforce. One way to achieve this is by designing the work system in such a way that there is a balance between a team's demands and its resources [55]. The design of work systems in nursing care is predominantly determined by tasks or specific actions in operational care delivery. They are supported by tools and technology, effective organizational design, collaboration, coordination, and the physical work environment. These work systems, in turn, influence patients, care providers and organizational outcomes [56].

In a balanced care team, there is a strategic alignment among the team's capacity (e.g., staffing, educational level, support, etc.), its operational processes, and the demands of care (e.g., the complexity of care, patient turnover, physical demands, etc.), all aimed at optimizing

outcomes for both the team and the patients. Intuitively, balanced care teams have the capacity to adapt their work system and processes to improve care based on their feedback and learning strategies as a resilient workforce [57–59].

Some of the factors identified in this review are used to inform decisions by nursing leaders and policymakers. To date, software tools exist to assess patient demand and care team characteristics (absenteeism, vacancies, staff leave) or to estimate and optimize team compositions [60], for example, based on mandatory staffing levels. However, these systems need to be adjusted to the context and need governance by management to be used for staff deployment [61]. In the future, nurse leaders will have to work with large volumes of organizational and patient data. An overview of the influencing factors on the performance of nursing teams could offer guidance and support to make decisions on staffing and competencies [62]. The integration of metrics measuring these factors in a decision support system could be beneficial for decision-makers if clinicians agree on the importance, availability, and impact of those metrics.

Strengths and limitations
To the best of our knowledge, this is the first study to review evidence about all influencing factors in the organization of nursing care teams, their work environment, team performance and nurse as well as patient outcomes. The review process followed the PRISMA-ScR protocol [26] to ensure the quality of reporting.

Nevertheless, this study is, like others, not without limitations. Foremost among these is the methodological challenge associated with our comprehensive approach to literature inclusion in this scoping review. Given our objective to encompass all relevant literature, a critical appraisal of the included articles to assess the quality of evidence was beyond our scope. Consequently, we are cautious in making definitive conclusions regarding the evidence quality. Notably, a significant majority of the studies we reviewed (70%) employed descriptive cross-sectional designs. While this design offers numerous advantages, such as the ability to provide a snapshot of phenomena at a specific point in time and contribute to hypothesis generation, it inherently limits the ability to establish causality [63, 64]. The prevalence of descriptive and cross-sectional studies in our review mirrors the current research landscape within our field, where such methodologies are often favored for their practicality and accessibility. However, this trend underscores a critical gap in the literature – the need for more longitudinal and experimental designs that can more effectively study causal relationships and assess intervention outcomes. Addressing this gap should be a priority for future research, with a focus on integrating higher-quality

evidence through more robust study designs. This would significantly enhance our ability to draw causal inferences and advance the field's understanding of effective interventions and their impacts.

In addition, there are inconsistencies regarding the measurements used in the literature. For example, in both academic consensus and general practice, a lack of agreement exists on how to measure and report nurse staffing levels. Nurse staffing levels are measured by nursing hours per patient day, nurse-to-patient ratio, bed-to-nurse ratio, etc. Standardized reporting of nurse staffing levels will allow comparisons between study results as well as the opportunity to use more data analytics in healthcare. Moreover, by only including literature that showed a significant effect on one of the dimensions, the risk of publication bias exists. However, this scoping review aimed to provide nursing managers, academics, and policymakers with an overview of the current state of research and which domains proved to have a significant impact. As such, we prefer to focus on the influencing factors that are already found to inform policymakers, researchers, and nurse managers.

Second, we made a deliberate decision not to include papers about interventions, policies, and the consequences of the COVID-19 pandemic, based on the assumption that these crisis circumstances are not representative of future operational norms. Nevertheless, it is undeniable that the pandemic crisis has significantly heightened the relevance of the current research. We also recognize that the complex causes and effects of the pandemic on healthcare teams and patient care merit their own dedicated research endeavors, encompassing both comprehensive reviews and longitudinal studies. Future research should specifically address the unique challenges and adaptations brought about by the COVID-19 pandemic, as a separate focus would enable a more nuanced understanding of its impact. Such research could facilitate the development of targeted interventions and policies to enhance healthcare resilience and effectiveness in future crises, thereby addressing the gap left by our exclusion of pandemic-related literature.

Third, we acknowledge that the prevalence of various domains in the literature is not a measure of their significance or importance, as this can be distorted by the frequent use of the Practice Environment Scale of the Nursing Work Index (PES-NWI) in research. The PES-NWI is an instrument used to measure factors that enhance or attenuate a nurse's ability to practice nursing skillfully and deliver high-quality care [65]. For example, nurse−physician-relationship, staffing levels and leadership are part of the five subscales of PES-NWI: "nurse participation in hospital affairs", "nursing foundations for quality of care", "nurse manager ability, leadership, and support of nurses", "staffing and resource adequacy"

and "collegial nurse–physician relations". Although the PES-NWI is a widely recognized and reliable tool for assessing the work environment of nurses, our research highlights the need for decision-makers to consider additional factors that are crucial for assessing the nursing work environment. For example, team and organizational demographics have been extensively researched by management scholars [66–69].

Lastly, despite conducting an extensive search across two comprehensive databases, the specific nature of our search strings and the practical challenges of including all possible databases might lead to the inadvertent omission of relevant studies.

To promote a resilient workforce, ensure high-quality care, and enhance patient safety, it is essential to examine and integrate other influential factors that we have identified. Griffiths et al. (2020) [60] suggested that future research should concentrate on how to optimally utilize currently available staffing tools. Moreover, while the formation of balanced care teams is crucial, it is equally important to identify and address situations where capacity and demand are misaligned [70, 71]. In addition, we recommend that future research should further investigate the concept of balanced care teams to fully comprehend its potential benefits and limitations. By doing so, decision support systems can incorporate this research and strive for balanced care teams by optimizing a team's capacity to meet their specific demands while considering the context.

Additionally, to augment the robustness of healthcare research, future investigations should employ more rigorous methodologies, such as randomized controlled trials (RCTs) or longitudinal studies. It is also vital to standardize the measurement tools used across studies to ensure comparability and enhance the generalizability of findings. This approach will not only strengthen the validity of the findings but also facilitate their integration into broader meta-analyses, thereby enhancing their applicability in real-world settings. Furthermore, the development and application of comprehensive theoretical and organizational frameworks are recommended to enrich our understanding of the dynamics within healthcare teams. These frameworks should aim to integrate multifaceted aspects of healthcare delivery, providing deeper insights that can inform policy and practice. Finally, the theoretical framework of balanced care teams introduced in this scoping review should be subjected to empirical validation.

Conclusions

Marceau et al. [72] noted that the COVID-19 pandemic has intensified the existing healthcare crisis and posed a long-lasting burden on the healthcare system. Nevertheless, this crisis presents an opportunity for policymakers to address the shortage of nurses. We extensively reviewed 35 factors that impact nursing practice and organized them into nine overarching domains. We found that policymakers and decision-makers can modify several of these factors to attract and retain nurses.

Nursing leaders, in particular, can use these factors to create well-balanced teams by matching capacity with demand while considering the team's context. This can lead to improved patient outcomes and heightened job satisfaction among nurses. To expand the knowledge in this area, future research should explore other elements beyond staffing levels. For instance, researchers could investigate the impact of team composition, which includes demographic characteristics, nurse autonomy, and work-life balance.

Abbreviations

CNO	Chief Nursing Officer
COVID	19-coronavirus disease 2019
CT	Clinical Trial
ISI	Institute for Scientific Information
PES	NWI-Practice Environment Scale of the Nursing Work Index
PRISMA	ScR-Preferred Items in Systematic Reviews and meta-analysis extension for Scoping Reviews
RCT	Randomized Controlled Trial
RN	Registered Nurse
WHO	World Health Organization

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-024-11625-5.

Supplementary Material 1.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available in the supplementary material.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

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Competing interests

The authors declare no competing interests.

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