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KU LEUVEN

DOCTORAL SCHOOL
BIOMEDICAL SCIENCES

CARE LEFT UNDONE AMONG PHYSICIANS

A MULTILEVEL MIXED METHODS STUDY

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Dissertation presented in partial fulfilment
of the requirements for the degree of
Doctor in Biomedical Sciences

SUMMARY

Ensuring safe, effective and comprehensive care remains one of the fundamental challenges of healthcare systems. Despite decades of quality and safety reforms, care deficits persist and have been described as a wicked problem. Research on “care left undone” (CLU) has primarily focused on nursing, while the physician perspective has remained underexplored. This dissertation aimed to close this gap by investigating the prevalence, antecedents and consequences of CLU among physicians, examining how it is conceptualised in the literature, and exploring how physicians experience and rationalise this phenomenon in practice.

The first study, based on survey data from more than 1,900 physicians working in 56 hospitals across six European countries within the Magnet4Europe project, revealed that CLU is highly prevalent: 78% of physicians reported leaving one or more tasks undone during their most recent shift. Activities related to communication, education and administrative responsibilities were most frequently omitted, whereas direct physical care tasks were least often left undone. CLU was consistently associated with high workload, inadequate staffing, emotional exhaustion, job dissatisfaction and lower perceived quality of care, underscoring its systemic roots.

The second study applied a multilevel latent class analysis that integrated data from both nurses and physicians to identify job demand–resource profiles within hospital contexts. Four distinct profiles emerged, ranging from high-strain (high demands, low resources) to low-strain (low demands, high resources). Healthcare workers in the high-strain profile group, demonstrated higher levels of CLU, burnout and intention to leave, for both physicians and nurses. These findings demonstrate that CLU is shaped not only by professional role but also by shared organisational environments that determine job characteristics across staff groups.

The third study, a scoping review of international literature, revealed a fragmented and inconsistent knowledge base on physician CLU. Terminology and conceptual framing were dominated by nursing perspectives, and no unified physician-specific framework was found. This lack of conceptual clarity hampers cumulative knowledge building and highlights the need for integration of physician perspectives into the broader field of unfinished care research.

Finally, a qualitative study based on semi-structured interviews with physicians provided insights into how CLU is understood and experienced in daily practice. Physicians described CLU as an unavoidable outcome of systemic pressures and competing priorities, often associated with administrative overload and time scarcity. They reported experiencing moral distress when unable to meet professional standards of care, but also rationalised omissions in line with their role boundaries and professional identity. A cross-cutting theme of identity emerged, shaping how physicians perceived and responded to CLU.

By integrating quantitative, conceptual and qualitative findings, this dissertation provides the first comprehensive account of physician CLU. It extends the scope of unfinished care research to physicians, introduces joint analyses of nurses and physicians in shared hospital contexts, and develops a physician-specific instrument. Conceptually, it integrates operational (systems and workload), normative (guidelines and standards) and ethical (moral distress and professional identity) perspectives on unfinished care.

The findings have important implications for health policy and practice. Addressing CLU requires systemic interventions that go beyond individual accountability. Hospitals and policymakers must ensure adequate staffing and supportive work environments, reduce administrative burden and recognise CLU as a signal of system misalignment rather than individual failure. Future research should further validate physician-specific instruments, evaluate interventions to reduce CLU, and examine long-term implications for patient safety and workforce sustainability.

In conclusion, this dissertation demonstrates that CLU among physicians is highly prevalent, closely linked to job strain and professional well-being, and deeply embedded in organisational and systemic contexts. By combining large-scale survey analyses, cross-professional modelling, a systematic literature review and qualitative exploration, it provides both empirical evidence and conceptual clarity. The work lays a foundation for interdisciplinary and system-level strategies to mitigate CLU and strengthen healthcare quality.

BEKNOPTE SAMENVATTING

Het waarborgen van veilige, effectieve en volledige zorg blijft een van de centrale uitdagingen voor hedendaagse gezondheidszorgsystemen. Ondanks decennialange inspanningen en hervormingen op het gebied van kwaliteit en patiëntveiligheid blijft niet uitgevoerde zorg een hardnekkig en complex probleem, vaak gekarakteriseerd als een *"wicked problem"*. Het bestaande onderzoek heeft zich tot op heden voornamelijk gericht op verpleegkundige contexten, waardoor het perspectief van artsen onderbelicht is gebleven. Dit doctoraatsonderzoek beoogt deze lacune te verkleinen door de prevalentie, antecedenten en gevolgen van niet uitgevoerde zorg door artsen te onderzoeken, de conceptuele invulling ervan in de literatuur te analyseren, en te verkennen hoe artsen dit fenomeen in de dagelijkse praktijk begrijpen, ervaren en hiermee omgaan.

De eerste studie, gebaseerd op surveygegevens van meer dan 1.900 artsen werkzaam in 56 ziekenhuizen in zes Europese landen binnen het Magnet4Europe-project, toont aan dat niet uitgevoerde zorg prevalent is: 78% van de artsen rapporteerde tijdens hun meest recente shift één of meerdere taken niet te hebben uitgevoerd. Activiteiten gerelateerd aan communicatie, educatie en administratieve verantwoordelijkheden werden het vaakst niet uitgevoerd; directe fysieke zorgtaken het minst. Niet uitgevoerde zorg vertoonde een associatie met hoge werkdruk, ontoereikende personeelsbezetting, emotionele uitputting, job ontevredenheid en een lagere ervaren zorgkwaliteit, wat de structurele aard van het probleem onderstreept.

In de tweede studie werd een multilevel latent class analyse toegepast waarin gegevens van zowel artsen als verpleegkundigen werden geïntegreerd om latente profielen gebaseerd werkeisen (job demands) en energie bronnen (job resources) te identificeren. Vier wel afgelijnde profielen kwamen naar voren, variërend van high-strain (hoge werkeisen, lage energie bronnen) tot low-strain (lage werkeisen, hoge energie bronnen). Zorgverleners in een high-strain profiel voerden vaker zorg die noodzakelijk werd geacht niet uit, vertoonden een hogere mate burn-out en intentie om het beroep te verlaten, dit bij zowel artsen als verpleegkundigen. Deze bevindingen tonen aan dat niet uitgevoerde zorg niet alleen door de professionele rol wordt bepaald, maar ook door gedeelde organisatorische omgevingen die de job kenmerken van verschillende personeelsgroepen vormgeven.

De derde studie, een scoping review, bracht aan het licht dat de literatuur over niet uitgevoerde zorg bij artsen gekenmerkt wordt door fragmentatie en een gebrek aan conceptuele coherentie. Terminologie en conceptuele kaders bleken sterk geïnspireerd door verpleegkundige perspectieven, en een arts-specifiek conceptueel framework ontbrak. Deze conceptuele onduidelijkheid belemmert de cumulatie van kennis en benadrukt de noodzaak om het perspectief van artsen systematischer te integreren in het bredere onderzoeksveld rond niet uitgevoerde zorg.

Ten slotte bood een kwalitatieve studie, gebaseerd op semigestructureerde interviews met artsen, inzicht in hoe niet uitgevoerde zorg in de dagelijkse praktijk wordt begrepen en ervaren. Artsen beschreven niet uitgevoerde zorg als een onvermijdelijk gevolg van systeemdruk en concurrerende prioriteiten, vaak gerelateerd aan administratieve overbelasting en tijdsschaarste. Zij rapporteerden morele stress wanneer zij niet aan professionele zorgstandaarden konden voldoen, maar rationaliseerden tegelijkertijd bepaalde vormen van niet uitgevoerde zorg in lijn met de afbakening van hun professionele verantwoordelijkheden en hun professionele identiteit. Een overkoepelend thema van professionele identiteit kwam hierbij duidelijk naar voren en beïnvloedde hoe artsen niet uitgevoerde zorg percipieerden en ermee omgingen.

Door kwantitatieve, conceptuele en kwalitatieve bevindingen te integreren, biedt dit doctoraatsonderzoek een omvattende analyse van niet uitgevoerde zorg bij artsen. Het verruimt het onderzoeksveld van niet uitgevoerde zorg naar de context van artsen, introduceert geïntegreerde analyses van artsen en verpleegkundigen binnen gedeelde ziekenhuisomgevingen, en ontwikkelt een arts-specifiek meetinstrument. Conceptueel worden operationele (systeem en werkdruk), normatieve (richtlijnen en standaarden) en ethische (morele stress en professionele identiteit) perspectieven samengebracht in een geïntegreerd kader.

De bevindingen hebben belangrijke implicaties voor gezondheidsbeleid en praktijk. Het aanpakken van niet uitgevoerde zorg vereist systeemgerichte interventies die verder gaan dan individuele verantwoordelijkheid. Ziekenhuizen en beleidsmakers dienen te zorgen voor adequate personeelsbezetting en ondersteunende werkomgevingen, de administratieve lasten te verminderen en niet uitgevoerde zorg te erkennen als een signaal van systeem falen in plaats van individuele tekortkoming. Toekomstig onderzoek zou arts-specifieke meetinstrumenten verder moeten valideren, interventies ter vermindering van niet uitgevoerde zorg moeten evalueren, en de langetermijngevolgen voor patiëntveiligheid en het welzijn van artsen moeten onderzoeken.

Samenvattend laat dit doctoraatsonderzoek zien dat niet uitgevoerde zorg bij artsen prevalent is, nauw samenhangt met werkdruk en professioneel welzijn, en diep verankerd is in organisatorische en systeemcontexten. Door grootschalige surveyanalyses, cross-professionele modellering, een systematische literatuurstudie en kwalitatieve verkenning te combineren, levert het zowel empirisch bewijs als conceptuele helderheid. Het werk vormt een basis voor interdisciplinaire en systeemgerichte strategieën om niet uitgevoerde zorg te verminderen en de zorgkwaliteit te versterken.

CONTENTS

LIST OF ABBREVIATIONS

AHRQ - Agency for Healthcare Research and Quality

AIC - Akaike Information Criterion

ANCC - American Nursing Credentialling Center

BAT - Burnout Assessment Tool

BERNCA - Basel Extent of Rationing of Nursing Care

BIC - Bayesian Information Criterion

CFA - Confirmatory Factor Analysis

CFI - Comparative Fit Index

CLMM - Cumulative Link Mixed Model

CLU – Care Left Undone

COPD - Chronic obstructive pulmonary disease

EE – Emotional Exhaustion

ICC - Intra-Class Correlation

ICL-BIC - Integrated Completed Likelihood BIC

IOM - Institute of Medicine's

JD-R - Job Demand Resources

LCA - Latent Class Analysis

MBI - Maslach Burnout Inventory

MLCA - Multilevel Latent Class Analysis

MMAT - Mixed Method Appraisal Tool

PCC – Population Concept Context

PES-NWI - Practice Environment Scale of the Nursing Work Index

PIRNCA – Perceived Implicit Rationing of Nursing Care

QEEUW - Questionnaire on the Experience and Evaluation of Work

REML - Restricted Maximum Likelihood

RMSEA - Root Mean Square Error of Approximation

SEIPS - Systems Engineering Initiative for Patient Safety

SEM - Social Ecological Model

SRMR – Standardized Root Mean Square Residual

TLI - Tucker-Lewis Index

TU – Tasks Undone

WHO - World Health Organisation

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CHAPTER 1

GENERAL INTRODUCTION AND RESEARCH OBJECTIVES

Within this introduction the phenomenon of care left undone among physicians is situated within the wider landscape of healthcare quality, patient safety, and workforce pressures. Persistent gaps between recommended and delivered care have been documented for decades, yet their origins and manifestations cannot be understood without acknowledging the complexity of contemporary health systems and the multiple lenses through which care deficits are studied. Concepts drawn from systems thinking, organisational science, economics, clinical standardisation, and healthcare ethics all offer complementary insights into why necessary care is not always completed as intended. Key theoretical and empirical traditions - ranging from missed and unfinished care to guideline adherence and moral distress – are brought together to clarify the contours of the broader problem and the distinct contributions each perspective makes. This provides the conceptual foundation for focusing specifically on physicians, a group whose experiences of care left undone have received limited empirical attention but are shaped by the same systemic pressures that have been extensively examined in nursing research. In doing so, the introduction lays the groundwork for understanding how care omissions arise, how they are patterned across professional groups and organisational contexts, and why the physician perspective represents a critical gap in existing scholarship.

1.1 CARE DEFICITS AS A WICKED PROBLEM IN HEALTHCARE

Efforts to ensure that all patients receive safe and effective care have long been central to healthcare policy. More than two decades after the publication of the Institute of Medicine's (IOM) landmark reports *To Err is Human* (1999)[1] and *Crossing the Quality Chasm* (2001),[2] healthcare systems across the globe continue to fall short of delivering consistently safe, effective, and comprehensive care.[3,4] These foundational documents catalysed international awareness of quality deficits in healthcare, emphasizing the prevalence of preventable harm, the fragmentation of care delivery, and the need for systemic reform.[5,6] In response to concerns about care quality, the IOM defined healthcare quality as *"the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."* They identified six foundational domains - safety, effectiveness, efficiency, patient-centredness, timeliness, and equity - which became the gold standard for quality.[2] These domains have since evolved into a broader multidimensional quality model developed by Lachman, Batalden, and Vanhaecht, incorporating additional aspects such as eco-friendliness, transparency, and a shift from patient-centred to person- and kin-centred care.[7]

Yet despite intensified policy attention, widespread quality improvement initiatives, and technological advances, substantial portions of patients still do not receive the care they need - or receive it too late, incompletely, or inconsistently.[8] This persistent gap reflects a deeper set of challenges.

Contemporary healthcare is increasingly defined by complexity, uncertainty, and constraint. Healthcare professionals operate in environments marked by rising patient expectations, growing numbers of older adults with multimorbidity, rapid technological change, and chronic workforce shortages - all of which place extraordinary and often conflicting demands on clinical practice.[9,10]

As it became evident that many care deficits could not be traced to isolated human errors or knowledge gaps, safety scholars increasingly turned to systems thinking - a paradigm rooted in disciplines such as engineering and cognitive psychology.[11–13] This approach emphasizes how performance is shaped not merely by individual competence but by the design of work environments, workflows, technologies, and organizational structures.[14–16] It provided a powerful framework for understanding why capable clinicians, acting in good faith, might still struggle to deliver consistent and complete care.

A central model within this paradigm is Reason's Swiss Cheese Model, which illustrates how adverse events occur when system defences - such as protocols, technologies, or organizational safeguards - are weakened by latent conditions like understaffing, poor communication, or design flaws.[17] These vulnerabilities, or "holes," may remain dormant, but when they align with active failures on the frontline, they create a trajectory for harm.[18] Building on this conceptual lineage, models from human factors engineering have enhanced our understanding of how care environments affect performance. A key framework is the Systems Engineering Initiative for Patient Safety (SEIPS), which views healthcare delivery as a socio-technical system where people, tasks, tools, technologies, and environments interact to shape care processes and outcomes.[19] SEIPS has evolved into SEIPS 2.0, incorporating feedback loops, emphasizing learning and adaptation, and including clinician wellbeing, patient experience, and system resilience as key outcomes.[20,21] SEIPS 2.0 suggests that care outcomes emerge from complex interactions between structural and cognitive components of work systems, rather than just individual competence or adherence to procedures. This model highlights how systemic constraints - such as workload compression and administrative burden - can lead to omissions in care. From this perspective, care left undone is not a personal failure but a symptom of a misaligned system, compelling professionals to navigate trade-offs under suboptimal conditions. This systems perspective aligns with Donabedian's classical model of healthcare quality, which differentiates between structure, process, and outcome.[22,23] Donabedian's model established the foundation for assessing healthcare quality by showing that delivery conditions (structure) shape how care is delivered (process), which affects results (outcome). SEIPS 2.0 elaborates by embedding this in a dynamic systems view: it shows how interactions within structural elements influence processes, and how these processes affect both patient outcomes and clinician experiences. SEIPS 2.0 operationalizes

Donabedian's schema within contemporary healthcare's complexity, offering a lens through which omissions can be understood as systemic phenomena.

This enduring gap between what care ought to be delivered and what care actually is delivered highlights a persistent and unresolved challenge and can be seen as a '*wicked problem'.*[24] Rittel and Webber introduced this term to describe societal challenges that lack clear boundaries or solutions, are shaped by divergent stakeholder values, and involve recursive, unpredictable system interactions.[24–26] Horst Rittel suggested that: *"the term 'wicked problem' refers to that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing. The adjective 'wicked' is supposed to describe the mischievous and even evil quality of these problems, where proposed 'solutions' often turn out to be worse than the symptoms."* Rather than reflecting isolated performance failures, the quality deficit in modern healthcare has come to be understood as a complex, evolving, and dynamic problem - one that resists definitive resolution despite decades of inquiry and reform.[27] Each attempt to address a wicked problem yields not a definitive solution but a reconfiguration of the challenge itself - often producing unintended consequences or novel dilemmas.[28]

Building on this systems perspective, a broad range of complementary research traditions has emerged to explore why care is not always delivered as intended. While grounded in different conceptual and disciplinary traditions, these approaches converge on a shared concern: the tension between professional obligations, evidence-based standards, and the practical constraints of care delivery. While by no means pretending to provide an exhaustive overview of all the research in this field, three particularly influential strands - care left undone, adherence to clinical guidelines, and moral distress – stand out and offer distinct yet interconnected insights into the structural, normative, and ethical dimensions of this persistent quality gap.

1.2 MULTIPLE CONCEPTUAL LENSES ON CARE DELIVERY GAPS

1.2.1 Care Left Undone: A Structural and Operational Lens

The concept of care left undone - also referred to as missed care, unfinished care, or implicit rationing - terms often used interchangeably, originated within nursing research. It denotes necessary clinical activities that are either omitted, delayed, or performed only partially due to resource constraints, time pressure, or competing demands. Scientific inquiry commenced in the United States in 2001 with the research conducted by Aiken et al. (2001), who introduced the term *care left undone* in the International Hospital Outcomes Study.[29] Aiken et al. (2001) demonstrated that omissions in essential nursing care - such as patient education, discharge planning, and basic hygiene - are widespread across hospitals in the United States, Canada, and Germany. These care deficits were not attributable to individual oversight, but were systematically linked to inadequate staffing, high workloads, and organizational inefficiencies. The study identified such omissions as symptoms of broader structural failings in healthcare delivery and emphasized their association with increased nurse burnout, job dissatisfaction, and intent to leave the profession. These findings underscore the need for systemic reform in workforce organization and care delivery models to mitigate care left undone.

The phenomenon of *missed nursing care* was first identified by Kalisch (2006) in a qualitative study of missed nursing care, resulting from twenty-five focus groups conducted with nurses and nursing assistants.[30,31] This foundational work introduced the concept of *missed care* as a distinct type of omission error in clinical practice, formalized within the Missed Nursing Care Model (see Figure 1.1). The model highlighted how resource constraints, communication failures, and internal prioritization decisions shape care omissions, thereby reframing missed care as a systemic rather than individual failing. In Europe, Schubert et al. (2007), employed the concept of *implicit rationing of care*, utilizing the Donabedian theoretical framework of resource – process - outcome, with a primary focus on the process.[32] Their work operationalized missed care as a form of care rationing, emphasizing that when resources are insufficient, nurses make discretionary decisions about which elements of care to omit.

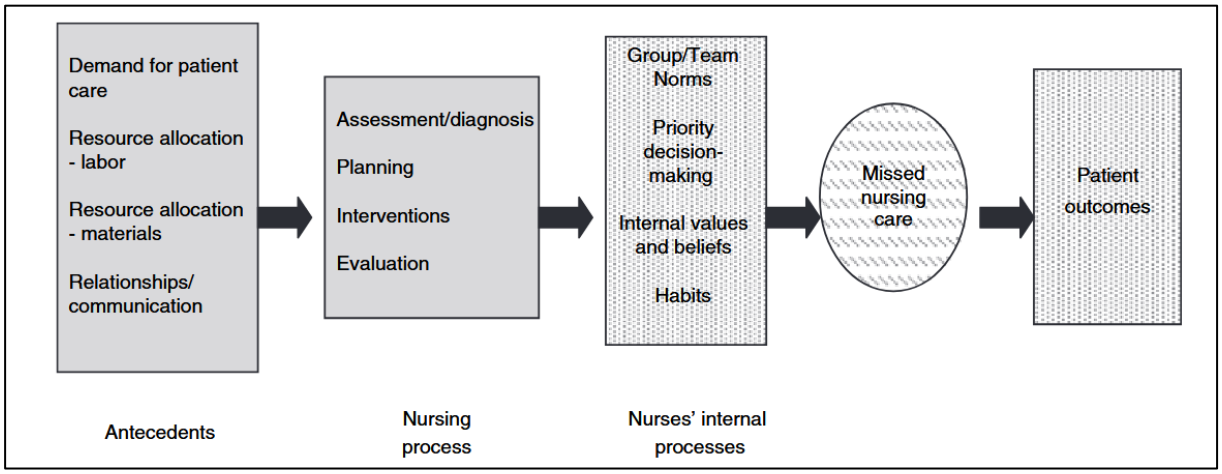

Figure 1-1 -The Missed Nursing Care Model

While there are multiple theoretical lenses to look at care left undone, it is apparent that the most widely adopted meta-theoretical lens resides in the systems theory, framing care left undone as an emergent property of an interdependent organizational subsystem. Inspired by Reason's (2000) Swiss Cheese Model of safety incidents, scholars in the field have emphasized how omissions occur when latent conditions - understaffing, poor coordination, ineffective communication - align to prevent the safe and complete delivery of care.[18] Studies such as those by Aiken et al. (2001) and Ausserhofer et al. (2014), conceptualize missed care as the result of upstream factors including staffing levels, resource allocation, and work environment characteristics influencing care delivery processes and ultimately patient and staff outcomes.[29,33] From this systems perspective, care omissions emerge not primarily from individual failings but from breakdowns within interdependent organizational subsystems, where limited resources, fragmented workflows, and inadequate feedback loops produce persistent mismatches between care demands and available capacity. Open systems theory and the Nursing Services Delivery Theory by Meyer & O'Brien-Pallas (2010) extend this logic by conceptualizing care delivery as a transformation of inputs (e.g., staffing, equipment) into outputs (e.g., completed care, patient outcomes) through dynamic processes (e.g., prioritization, teamwork).[34]

Complementing the systems perspective, economic theory conceptualizes care left undone as a form of implicit rationing driven by scarcity, opportunity costs, and production constraints. With health-care budgets inherently finite, some degree of rationing becomes unavoidable. Healthcare organizations, from this viewpoint, function as production systems that transform inputs - such as labour and equipment - into outputs of patient care services, making efficient use of nursing labour central to remaining care quality. Under resource scarcity, managers and frontline clinicians must make implicit prioritization decisions, determining which care activities are completed and which are omitted.[35,36] Drawing on microeconomic principles, this perspective emphasizes how labour shortages, skill-mix

imbalances, and non-value-adding tasks reduce clinical productivity, leading to systematic care omissions under constrained supply.[37]

A second stream of economic research applies marginal productivity models to estimate staffing efficiency and forecast care quality under fluctuating demand - reflected in research examining the economic consequences of staffing levels, skill-mix, and education on patient outcomes such as mortality, readmissions, and adverse events.[38–40] As Jones and Yoder (2010) note, economic theory offers a valuable framework to formalize trade-offs and inform decision-making in healthcare, yet it remains underutilized in nursing research.[36] Their work calls for more deliberate integration of economic reasoning into nursing administration to better understand and manage resource-constrained care environments.

Despite the breadth of theoretical perspectives applied to the study of care left undone - ranging from systems theory and microeconomics to neoliberal political critique and structuration theory - the field has been marked by conceptual fragmentation. Each lens offers distinct explanatory power: systems theory identifies latent organizational failures; economic models formalize resource constraints and trade-offs; political economy situates omissions within broader structural reforms; and structuration theory bridges macro constraints with micro-level decision-making. This diversity has also hindered theoretical integration and cross-study comparability. In response to this dispersion, Jones et al. (2019) proposed a comprehensive and unifying framework grounded in the social ecological model.[41] Their model weaves together multiple levels of influence - individual, interpersonal, organizational, and systemic - while integrating antecedents (e.g., staffing, leadership), mediating mechanisms (e.g., clinical judgment, team culture), and consequences (e.g., patient harm, moral distress). By capturing the recursive and multilevel nature of care omissions, the framework reframes missed care not as isolated or idiosyncratic events, but as the emergent outcome of dynamic interactions across system levels. It provides a coherent conceptual scaffold for advancing theoretical clarity in the field and offers a transferable lens for analysing care left undone across healthcare professions, including the medical domain explored in this dissertation.

1.2.1.1 Empirical developments and outcomes of care left undone

The empirical investigation of care left undone has evolved rapidly over the past two decades, moving from descriptive accounts of staff shortages and burnout to sophisticated analyses of how care omissions shape - and reflect - system performance.[42,43] Today, missed care is widely recognized as a critical outcome indicator in its own right, and a key mediator between structural inputs (like staffing levels and work environment) and patient or workforce outcomes.[44] Global causes, prevalence,

patterns, and consequences of care left undone have been studied extensively - albeit mostly within the nursing profession.[45–47]

A major driver of empirical development has been the creation of standardised measurement instruments. Among the most widely used are the Tasks Undone (TU) scale, the MISSCARE Survey and the BERNCA tool.[48] The first quantitative measure for the phenomenon of care left undone (TU-7) emerged from the International Hospital Outcomes Research Consortium (IHORC).[29,49–51] Multiple versions of the TU-scale were developed, ranging from TU5 to TU13, with feature items from the BERNCA.[32,52] The BERNCA instrument included 20 items identified through the literature and practical experience as being necessary but particularly vulnerable to omission during resource shortfalls. The BERNCA was extended to 32 items and a response option of “task not needed” was added.[53] Several variations of the BERNCA were developed, such as the PRINCA for use in the neonatal context and the PIRNCA for use in medical surgical units. Finally, the MISSCARE survey, developed by Kalisch et al., (2009) is one of the widely used and validated instruments to quantitatively measure car left undone.[54] In contrast to the other instruments mentioned, the MISSCARE Survey comprises two part, where Part A represents an overview of nursing activities and Part B an overview of potential reasons why certain activities were not performed. The MISSCARE survey has been validated in multiple languages. In addition, the MISSCARE-patient instrument is the only validated instrument to measure unfinished care from the patients perspective.[55] These instruments transformed the concept from anecdote to quantifiable construct, enabling large-scale studies across hospitals, regions, and countries. The development of measurement instruments is an ongoing process and new measures are still being developed; Bassi et al. (2020) developed the Unfinished Nursing Care Survey (UNCS) in an attempt to develop a comprehensive tool able to reflect and capture the broader concept of unfinished care.[56]

Care left undone has been empirically linked to a range of adverse outcomes affecting both patients and healthcare professionals. In hospital settings, missed care has been associated with numerous patient safety indicators, including increased medication errors, higher rates of nosocomial infections, patient falls, pressure ulcers, and dialysis-related adverse events.[57–60] Additionally, patients who experience care omissions report lower satisfaction with their hospital care, reflecting unmet needs in communication, autonomy, emotional support, and basic physical care.[61–63] The implications of missed care extend beyond patient outcomes to affect nurses and healthcare organizations. Higher levels of care left undone have been linked to increased nurse burnout, emotional exhaustion, job dissatisfaction, higher turnover, and elevated intention to leave the profession.[64–67] These professional consequences underscore the cumulative strain that repeated care omissions place on clinicians, contributing to both workforce instability and organizational performance challenges.

Among the most consequential associations is the link between missed care and patient mortality. Ball, Bruyneel et al. (2018) provided one of the first empirical demonstrations of the mediating role of missed care, showing that care left undone serves as an explanatory mechanism linking lower staffing levels to higher mortality.[68] In this model, insufficient staffing contributes to increased missed care, which in turn elevates the risk of complications and death through diminished patient surveillance and delayed detection of potentially reversible clinical deteriorations.

1.2.2 Adherence to Guidelines: The Evidence-Based Lens

In parallel to the literature on care left undone, another body of research has focused on a distinct yet related phenomenon: the extent to which care aligns with established clinical practice guidelines (CPGs). These guidelines synthesize the best available evidence to inform clinical decision-making, optimize patient outcomes, and reduce unwarranted variation in care delivery. Yet, consistent adherence to guidelines remains elusive across many clinical contexts. The landmark study by McGlynn et al. (2003) offered one of the earliest comprehensive evaluations of guideline adherence in the United States, revealing that patients received only 54.9% of recommended care across acute, chronic, and preventive domains.[8] This sobering finding has since been corroborated by numerous studies across countries, specialties, and diseases, consistently documenting substantial gaps between evidence-based recommendations and actual practice.

Such deviations from guidelines are not trivial. Across a range of conditions - such as myocardial infarction, colorectal cancer surgery, hip fractures, and COPD exacerbations - studies repeatedly show considerable underuse of recommended interventions. For instance, geriatric hip fracture patients received on average only 60% of the recommended in-hospital care, while adherence rates averaged 44% for colorectal cancer surgery.[69,70] Similar patterns emerge in COPD care, where adherence often remains below 50%, despite the existence of robust international guidelines.[71]

These empirical patterns reflect not only performance gaps but also expose the complex determinants of guideline adherence. As Shehu et al. (2024) recently synthesized, barriers to guideline adherence are multifactorial, ranging from knowledge deficits, resource constraints, and institutional support, to the perceived applicability and usability of the guidelines themselves.[72] Moreover, guideline adherence is not purely a matter of individual clinician behaviour, but is embedded within organizational structures, team dynamics, and broader healthcare system features.

Unlike care left undone, where decisions are often made under immediate resource constraints, guideline adherence research focuses on whether the right care is provided for the right patient under optimal circumstances. Yet both research strands share a common underlying feature: they are shaped by the structural and systemic realities of contemporary healthcare organizations, where tensions

between professional autonomy, standardization, resource allocation, and patient-centred care are continuously negotiated.

1.2.3 Moral Distress: The Ethical and Experiential Lens

A third, increasingly prominent lens is that of moral distress. This concept captures the emotional and ethical dissonance experienced by healthcare professionals when they know the morally appropriate course of action but are unable to pursue it due to internal or external constraints.[73] Initially developed in nursing ethics, the concept has expanded in recent years to include physicians and other professionals, particularly in high-pressure environments such as intensive care, emergency medicine, and palliative care. Moral distress is distinct from general occupational stress: it arises not from workload alone, but from the perception that systemic barriers, institutional policies, or hierarchical dynamics compromise one's ethical integrity.[74] Physicians may experience moral distress when forced to provide care they perceive as futile, when administrative demands override clinical priorities, or when resource scarcity prevents them from acting in the patient's best interest. Recent work has conceptualized moral distress as a relational and systemic phenomenon, shaped by organizational culture, socio-political structures, and the moral fabric of professional identity.[75] Ethical analyses using principle and care ethics frameworks have highlighted how moral distress challenges core values such as autonomy, beneficence, and justice, and how it undermines the capacity for responsive, person-centred care. The experience of moral distress not only affects professional well-being but has been associated with burnout, disengagement, and reduced quality of care.

1.3 NARROWING THE FOCUS: ADDRESSING CARE LEFT UNDONE AMONG PHYSICIANS

Although research on care delivery deficits has advanced considerably over the past two decades, a critical limitation remains: the empirical and conceptual near absence of the physician perspective, particularly within the study of care left undone. Most investigations into missed care have focused on nursing populations, using instruments and frameworks tailored to nursing roles, workflows, and professional values. Consequently, the types of care activities examined, the language used to describe them, and the moral framing of omissions have been largely shaped by the nursing profession.[76] This mono-professional focus has left a substantial gap in our understanding of how care omissions manifest in medical work. Yet the systemic drivers of missed care - staffing constraints, administrative overload, prioritization dilemmas, and resource limitations - are not exclusive to nurses. Physicians operate within the same organizational settings, navigate similar time pressures, and face parallel tensions between institutional constraints and professional ideals. In fact, the nature of physicians' responsibilities - diagnostic decision-making, end-of-life discussions, coordination of complex care trajectories - may expose them to a different spectrum of care omissions, often invisible in standard measurement tools or theoretical frameworks.

Moreover, the ethical stakes of care left undone may be experienced differently in medical practice. Physicians often hold greater formal autonomy but must reconcile this with high expectations of decisional leadership, bureaucratic accountability, and clinical performance. When they are unable to act in alignment with their own professional judgment - whether due to time scarcity, systemic inefficiencies, or conflicting guidelines - physicians may experience moral distress, moral residue, and erosion of professional integrity. However, these experiences remain underexplored in both the empirical literature and in the conceptual discourse on missed care.

This PhD study seeks to address this blind spot. It focuses explicitly on care left undone among physicians, aiming to understand how they conceptualize, experience, and respond to the phenomenon. To do so, it draws on a combination of quantitative and qualitative approaches and is guided by the Social Ecological Model (SEM) as its overarching theoretical framework.[77] The SEM provides a multilevel perspective on healthcare behaviour and outcomes, conceptualizing care delivery as shaped by intersecting influences at the individual (e.g., workload, clinical priorities), interpersonal (e.g., team dynamics), organizational (e.g., staffing, leadership, workflow design), and system-level (e.g., health policy, financing) levels.

By situating physicians' experiences of care left undone within this layered ecological context, the thesis aims to move beyond descriptive accounts of omission and toward a more integrated understanding of their antecedents, consequences, and potential mitigation strategies. In doing so, it

contributes not only to the empirical expansion of a predominantly nursing-focused literature, but also to the theoretical integration of operational, normative, and ethical dimensions of care delivery gaps. Ultimately, this work seeks to inform more inclusive, interprofessional, and systemically grounded approaches to understanding and addressing why necessary care is sometimes left undone - particularly in the hands of those tasked with making the most consequential clinical decisions.

1.4 RESEARCH OBJECTIVES

The overall goal of this PhD dissertation is to explore the concept of care left undone among physicians. First, we aim to examine the prevalence of care left undone among physicians and to explore its associated antecedents and consequences. Second, we aim to explore how distinct job profiles, determined by both job demands and job resources, are distributed among both nurses and physicians and how these profiles are associated with care left undone. Third, we aim to identify existing theories, concepts, and knowledge gaps related to care left undone among physicians. Finally, we aim to explore and understand how physicians interpret and experience this phenomenon in practice. To achieve the overall research objective, specific and detailed objectives were formulated and organised in chapters.

Research objective 1: Explore the prevalence and patterns of care left undone among physicians and identify its associated antecedents and consequences.

In Chapter 2, baseline data from the Magnet4Europe study were used to examine the prevalence and patterns of care left undone among physicians and to explore the association between the organisational context of physicians and care left undone.[78,79] As no validated instrument was available to evaluate care left undone among physicians, an investigator-developed instrument was used. This instrument is conceptually derived from the Tasks Undone scale, first used in the International Hospital Outcome Study and adapted for this study to the context of physicians. Due to the hierarchical nature of the data, generalized linear mixed models were used to explore the association between the organizational context of physicians and care left undone.

Research objective 2: Explore how job demands and job resources jointly shape distinct job profiles for physicians and nurses within a shared hospital environment, and how these profiles relate to care left undone.

In Chapter 3, follow-up data from the Magnet4Europe study were used.[78] Mainly variables that were identical for nurses and physicians were used in this evaluation, allowing for more advanced and direct comparisons to be made between both professional groups. While prior studies have linked job demands and resources to care left undone, most research has applied variable-centred approaches that overlook the complex ways in which job characteristics co-occur and cluster within healthcare professionals. Moreover, little is known about how shared hospital work environments simultaneously shape job experiences across professional groups. Therefore, this study applied a multilevel latent class approach to identify distinct job profiles among physicians and nurses, capturing the interaction between job demands and resources, and to examine how these profiles relate to care left undone.

Research objective 3: Explore how current scientific conceptualizations of care left undone among physicians aligns with physicians' own perceptions and experiences of unfinished care.

In Chapter 4, a scoping review was conducted to systematically map the available literature on care left undone among physicians, synthesize existing knowledge, and identify key conceptual, methodological, and empirical gaps to inform future research. The concept of care left undone has been extensively studied in nursing populations, research addressing its relevance in physicians remains scarce, fragmented, and conceptually inconsistent. Existing studies use heterogeneous terminology, varying operationalizations, and often lack theoretical grounding. In Chapter 5, a qualitative thematic analysis was conducted to investigate how physicians experience care left undone, which factors influence its occurrence, and how they manage the tensions and dilemmas inherent in care omissions. The absence of a shared conceptual framework in the literature underscores the need for in-depth exploration of physicians' perspectives.

1.5 MOTIVATING DATASET

A central foundation for this dissertation is the Magnet4Europe study, a large-scale European research initiative funded under the Horizon 2020 programme.[78] Magnet4Europe is designed as a waitlist cluster randomized controlled trial conducted in more than 60 acute care hospitals across six countries: Belgium, England, Germany, Ireland, Norway, and Sweden. The study evaluates whether redesigning hospital work environments according to the Magnet model can improve the well-being of nurses and physicians. It does so through a mixed-methods design, including longitudinal surveys of nurses and physicians, process evaluations, and qualitative case studies.

For the purposes of this dissertation, the Magnet4Europe study provided an unparalleled empirical basis to examine the phenomenon of care left undone among physicians. While this concept had been extensively studied in nursing, physician-focused research was largely absent. The Magnet4Europe survey included validated measures of work environment, job demands and resources, burnout, quality of care, and care left undone. This rich and standardized dataset enabled cross-national analyses of physicians' work environments and practices, while also allowing for multi-level modelling that accounts for variation between individuals, hospitals, and countries.

The first two empirical chapters of this dissertation draw directly on these data. Chapter 1 presents a physician-specific analysis of the prevalence, predictors, and outcomes of care left undone, based on a baseline survey conducted between November 2020 and July 2021 in 67 hospitals in six European countries. Chapter 2 applies the Job Demands–Resources framework in a latent profile analysis, using the Magnet4Europe data to identify distinct job profiles among physicians and nurses, and examining how these profiles relate to the likelihood of leaving care undone. For this study, a different dataset

based on the first follow-up survey conducted between May 2022 and August 2022 in 64 hospitals in six European countries was used.

The subsequent chapters relied on complementary sources of data. Chapter 3 is a scoping review that systematically mapped the fragmented and heterogeneous literature on unfinished and missed care among physicians, thereby situating the empirical findings within a broader conceptual field. Chapter 4 reports on semi-structured interviews with physicians, which generated in-depth qualitative insights into how physicians themselves interpret, rationalise, and experience care left undone in their daily practice in one teaching hospital, also participating in the Magnet4Europe study.

This combination of a large-scale international dataset with literature synthesis and primary qualitative data reflects a deliberate triangulation strategy, ensuring that the dissertation contributes both empirically and conceptually to advancing the field of care left undone among physicians.

1.6 RATIONALE AND RESEARCH TRAJECTORY: FROM PRAGMATIC BEGINNINGS TO CONCEPTUAL MATURATION

The conventional scientific cycle - particularly in the social and health sciences - typically follows a linear progression. This logic prioritizes conceptual clarity and contextual depth before engaging in hypothesis-driven research. Within this specific PhD trajectory, one would expect that the field of care left undone among physicians - largely underdeveloped and conceptually unrefined - would first be approached through foundational work leading to hypothesis-driven research. However, the trajectory of the present research diverges from this traditional sequence, following a different yet equally rigorous path - one that resonates with Kolb's experiential learning cycle, in which knowledge develops through a dynamic interplay of four stages: concrete experience, reflective observation, abstract conceptualisation, and active experimentation.[80]

The starting point was pragmatic. The first quantitative study provided concrete experience in Kolb's terms: it generated initial evidence on the prevalence, predictors, and consequences of care left undone among physicians. While valuable in its own right, this stage also exposed critical conceptual blind spots. These empirical insights invited reflective observation, raising questions about why care left undone varied across physicians and whether such variations could be understood through broader job characteristics beyond workload alone.

Building on this reflection, the second study applied the Job Demands–Resources framework in a multilevel latent class analysis, representing a form of abstract conceptualisation. By identifying distinct job profiles characterised by different constellations of job demands and job resources, this study provided a theoretically anchored explanation of variation in care left undone.

The final stages of the trajectory then deepened the conceptual lens. The scoping review systematically mapped the fragmented literature, confirming the limited conceptual coherence of existing studies. Subsequently, the qualitative thematic analysis of physicians' experiences with care left undone offered interpretive depth, capturing how physicians themselves frame, rationalise, and experience care left undone. Together, these studies represent active experimentation - an iterative refinement of the phenomenon's meaning and scope through conceptual integration and empirical exploration.

Viewed through Kolb's experiential learning cycle, this research trajectory is not a deviation but rather a dynamic and iterative process of knowledge development. Beginning with empirical observation and looping back into conceptual reflection and qualitative inquiry, the project exemplifies how pragmatic entry points can, through successive cycles of experience, reflection, abstraction, and experimentation, yield a more mature and nuanced understanding of an emerging phenomenon.

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CHAPTER 2

PREVALENCE, PREDICTORS AND OUTCOMES OF PHYSICIAN CARE LEFT UNDONE IN ACUTE CARE HOSPITALS ACROSS SIX EUROPEAN COUNTRIES DURING COVID-19: A CROSS-SECTIONAL STUDY

This chapter is published as:

Dello, S., Bruyneel, L., Kohnen, D., Witte, H. D., Schaufeli, W. B., Mchugh, M. D., Aiken, L. H., & Sermeus, W. (2023). Prevalence, predictors and outcomes of physician care left undone in acute care hospitals across six European countries during COVID-19: A cross-sectional study. *European Journal of Internal Medicine*. https://doi.org/10.1016/j.ejim.2023.10.021

ABSTRACT

Objective To examine the prevalence, antecedents and consequences of physician care left undone in acute care hospitals.

Design A multicentre, multinational, cross-sectional survey. An 11-item scale measured physician reports of care left undone. Antecedent measures examined were work environment and perceived workload. Potential consequences examined included emotional exhaustion, job dissatisfaction and perceived quality of care. Generalized linear mixed models were estimated to quantify associations between physician care left undone and the theorized antecedents and consequences.

Setting 56 acute care hospitals in six European countries.

Participants 1 963 physicians providing direct patient care to adult in-patients.

Results Four in five (78.3%) physicians left one or more care activities undone during their last shift. On average 3.1 (SD 1.0) of 11 activities were left undone. This varied between and within countries. A 10% increase at the hospital level of physicians saying they have too much work to do, significantly increased the odds of one or more activities being left undone (OR 1.414, 95% CI 1.268 – 1.578). Physicians' reports of care left undone were associated with increased odds of emotional exhaustion (OR 3.867, 95%CI 2.683 - 5.575) and rating quality of medical care as poor or fair (OR 3.395, 95% CI 2.215 – 5.204).

Conclusion Physicians frequently report leaving some necessary care undone. A shortage of resources compromises physicians' ability to do their jobs, impacting the quality of care they deliver and their job satisfaction and well-being. Ensuring adequate healthcare personnel resources should be a top priority for hospitals.

2.1 INTRODUCTION

Healthcare is becoming increasingly complex.[1] The COVID-19 pandemic arose, in many countries, in a context of prolonged underinvestment, with reduced staffing levels relative to need and poor working conditions contributing to deteriorating mental health of clinicians.[2–4] In the US, over 40% of physicians report at least one symptom of burnout.[5] In Europe burnout among physicians is also prevalent.[6] Burnout has a number of negative consequences for the individual physician, such as increasing risks of depression,[7] suicide, and substance abuse. Physician burnout also negatively impacts patient care as physicians burnout is associated with suboptimal quality of care, increased risk of medical errors[8,9] decreased productivity, job dissatisfaction, and intention to leave.[10,11]

Research on burnout points to the major drivers lying within the organisation, rather than the individual, and to unsupportive or harmful work environments.[12,13] In environments, characterised by overwork, shortage of resources, and lack of support, health care professionals may be forced to leave some necessary care undone, due to lack of time.[14] This mismatch between effort and personal accomplishment might plausibly be expected to contribute to high levels of burnout.[15]

Although, to date, most research in the field of care left undone and the impact of the hospital work environment has focused on nurses rather than physicians, what evidence exists supports this argument. Nurses in hospitals with more favourable work environments are significantly less likely to report leaving care nursing care left undone[16] and to have significantly higher rates of burnout.[17] Care left undone also impacts on patient outcomes; more nursing care being left undone is associated with increased odds of patients dying in-hospital following common surgical procedures.[18] However, research on the work environment and its association with care left undone by physicians is sparse.

Physicians working in acute inpatient care perform a broad range of activities within their scope of practice. Some are practical and specific to the patient's condition (e.g., ordering medical imaging, laboratory tests etc.) while other activities are generic, often related to communication and co-ordination of care (e.g. documentation, ward rounds, and responding promptly to concerns of nurses and others). Both, if left undone - which can also be referred to as omission of care – are hypothesised to negatively impact the quality of care and physician outcomes. To the best of our knowledge, no studies have focussed on documenting physician care left undone and the impact of this process on physician outcomes and quality of care.

This study has three aims, to: a) describe the prevalence and patterns of physician care left undone in acute care hospitals in six European countries during COVID-19; b) determine the association between the environment in which physicians work, their reported workload and care left undone; and c)

evaluate the association between physician care left undone and physician outcomes, including emotional exhaustion, job dissatisfaction and self-reported measures of the quality of care delivered.

2.2 METHODS

2.2.1 Design

We undertook a primary analysis of data collected within the Magnet4Europe study. Magnet4Europe is a cluster randomized controlled trial to evaluate the effect of organizational redesign of general acute care hospitals on nurses' and physicians' well-being. The intervention is a multi-component redesign, based on the Magnet© concept that seeks to create organisations that attract and retain nurses. A detailed outlining of the full Magnet4Europe is available elsewhere.[19] The findings presented here are based on results from a survey conducted at baseline.

2.2.2 Setting and sample

A convenience sample was recruited, consisting of 67 acute care hospitals in 6 European countries i.e. Belgium (n=14), England (n=14), Germany (n=20), Ireland (n=15), Norway (n=1) and Sweden (n=3). These hospitals have ≥ 150 beds, provide acute care for adults, and include, at least, internal medicine and/or surgery wards. Excluded were highly specialized hospitals e.g. those only providing psychiatric, tropical medicine, or paediatric care.

Within each hospital, physicians (including residents) were invited to take part in the online Magnet4Europe survey between November 2020 and July 2021. To obtain a homogeneous and comparable sample of physicians within and between countries, in- and exclusion criteria were applied to identify an eligible sample. Physicians were eligible if they: (1) had direct inpatient contact, (2) met the minimum qualifications as stipulated by Directive 2013/55/EU amending Directive 2005/35/EC on the recognition of professional qualifications, and (3) worked on adult medical and surgical inpatient units including intensive care units (ICU) or the emergency room (ER). Excluded were physicians working in specialized areas such as neonatology, paediatrics, obstetrics, psychiatry, operating room, pathology, microbiology, radiology, and medical imaging.

2.2.3 Variables and measures

2.2.3.1 Physician care left undone (analysed at the individual level)

The instrument to assess physician care left undone is derived from the Tasks Undone scale, first used in the International Hospital Outcome Study[20] and adapted for this study to the context of physicians. Physicians were asked: "On the most recent shift you worked, which of the following medical activities were necessary but left undone (fully or partially) because of time constraints?" and presented with a list of 11 items and asked to tick the box for each item that applied and was left

undone. If no care was left undone, respondents were able to tick a box "None of the above". The 11 items were: 'Provide a timely response to concerns raised by nurses'; 'Develop patient plan of care'; 'Diagnose, treat, or provide continuous care to inpatients'; 'Comfort/talking with patients'; 'Pain management'; 'Documentation of care'; 'Review, update and prescribe medications'; 'Coordinate patient care'; 'Educate colleagues and students'; 'Coordinate patient discharge planning'; and 'Ward rounds with nurses and other team members'. Cronbach's alpha was used to assess the level of internal consistency and scale reliability of the instrument measuring the physician work environment. In social sciences, a reliability coefficient (i.e. Cronbach's alpha) of 0.70 or higher is deemed acceptable. The value for the Cronbach's alpha for this scale was α=0.801, indicating that the items have a high internal consistency. Pilot testing was performed to assess face validity. Two measures of physician care left undone were derived. The first was a binary score signifying whether any - irrespective of the amount – physician care was left undone or not.[21] Second, a composite measure was calculated as the sum of how many of these 11 activities were left undone (range 0-11).[16]

2.2.3.2 Organizational context (analysed at the hospital level)

The quality of the physician work environment was assessed using nine items that capture modifiable organisational traits of the hospital such as the level of interdisciplinary teamwork, leadership, staffing and autonomy. The items used to assess the physician work environment are derived from the Practice Environment Scale of the Nursing Work Index (PES-NWI).[22] A full description of the items is provided in Table 2.3. Physicians were asked to what extent they agreed or disagreed that the various items included in this scale are present in their work environment using a four-point Likert-type scale (with fixed anchors from strongly disagree to strongly agree). Exploratory factor analysis revealed three factors: job experience, staffing, and autonomy. Model fit information and factor loadings for each item are provided in Supplemental Material 2-1. All items loaded on either of the three identified factors except for one item: 'A lot of teamwork between nurses and physicians'. This item was retained in this study as an individual item since teamwork between nurses and physicians is identified as a key element characterising a high-quality work environment in acute care hospitals.[23,24] Individual physician scores on each factor and the items related to teamwork were aggregated to the hospital level, creating a set of continuous measures. The hospital level scores were then divided into quartiles, labelled poor (lowest quartile), mixed (second and third quartile) or good (upper quartile).[25,26]

Experience of work and workload was assessed using four items derived from the Questionnaire on the Experience and Evaluation of Work (QEEW).[27] Physicians were asked how often they experience each of the following using a five-point Likert-type scale (with fixed anchors from never to always): 'Do you have too much work to do?', 'Do you have to work very fast?', 'Are you interrupted at work?' and 'Do you have to do many tasks simultaneously?'. To differentiate physicians who frequently or

infrequently experience high workload, the response categories 'always' and 'often' were clustered into one category and contrasted with the category clustering the responses 'never', 'seldom' and 'sometimes' for each of the four items. To determine the prevalence of high workload - for each of the four items – at the hospital level, we calculated the mean percentage of physicians reporting they often or always experience each item.

2.2.3.3 Physician reported outcomes (analysed at the individual level)

Physician burnout was measured using the 9-item emotional exhaustion (EE) subscale of Maslach Burnout Inventory (MBI).[28,29] The rationale for using the EE-subscale is that empirical evidence identifies this as a core element of burnout and is most frequently linked to outcomes compared to the other domains of the MBI.[8] Respondents rate the frequency with which they experience work-related feelings or emotions of emotional exhaustion on a 7-point Likert scale ranging from 'never' (score=0) to 'every day' (score=6). Physicians are considered to be emotionally exhausted if their individual sum score on the nine items is greater or equal to 27.[15]

Physician job dissatisfaction was derived from a single item asking physicians: "How satisfied are you with your current job in this hospital" using a 4-point Likert scale ranging from 'very dissatisfied' to 'very satisfied'. Physicians reporting to be 'very' or 'a little dissatisfied' with their job were considered dissatisfied.

Physician reported quality of care and patient safety grade were derived from two survey item and differentiated physicians (1) who reported that the quality of medical care was 'poor' or 'fair' rather than 'good' or 'excellent' and (2) who reported that the patient safety grade in their hospital was 'failing' or 'poor' compared to 'acceptable', 'very good' or 'excellent'.[30,31]

2.2.3.4 Physician characteristics (analysed at the individual level)

Physician characteristics included age, gender, and professional experience in the hospital where they were currently employed or performed most of their clinical activities, measured in years.

2.2.4 Analysis

Physicians' characteristics were described using means and standard deviation (SD) for continuous variables; categorical variables were described using frequencies and proportions. Prevalence and patterns of physician care left undone between and within countries were described using the mean percentage of physicians who reported not having performed each of the 11 activities.

We used generalized linear mixed models to explore the association between the organizational context of physicians and leaving any physician care undone (as binary outcome). First, we fitted a simple model for all three latent variables of the work environment, the variable related to teamwork

and each of the four workload variables. Second, we fitted a model including all three latent variables of the work environment, the variable related to teamwork and workload variables simultaneously. In all models, we used a random intercept for hospitals to account for the hierarchical structure of the data, i.e. physicians working within hospitals. All models included country, gender, and years of experience in the current hospital as fixed effects.

The association between our binary measure and individual-level physician-reported outcomes was explored using an identical modelling strategy. As a sensitivity analysis, we also used the composite score of physician care left undone, as a count variable, in the same models.

As there was only one Norwegian hospital, this was combined with the Swedish hospitals and presented jointly as "Scandinavia" throughout the analyses and presentation of findings. The level of significance was set at $p<0.05$. All analyses were performed using SAS software, version 9.4 of the SAS System for Windows.[32] Mplus Version 8.6 was used for the exploratory factor analysis.[33]

2.3 RESULTS

2.3.1 Physician respondents and their characteristics

23 300 physicians were invited to participate in the online survey; 2 184 physicians from 65 hospitals participated, resulting in an overall response rate of 9.3%. Only complete cases for the variables analysed were used. Hospitals with less than 10 observations were excluded, resulting in a final sample of 1 963 physicians in 56 hospitals, with on average 35 observations per hospital. Physician characteristics are described in Table 2-1. Except for Ireland, more than half of the respondents were male. On average physicians had 8.9 (SD 8.5) years of experience in their current hospital and 15.2 (SD 10.6) years of experience in their job overall, with large differences noted between countries.

Table 2-1 - Physician characteristics (n=1 963)

	Belgium	Germany	England	Ireland	Scandinavia	TOTAL
Number of respondents	464	450	497	251	301	1 963
Female (%)	43.3	43.8	48.1	52.7	47.5	46.5
Min. – Max. (%)*	15.4 – 70.0	12.5 - 69.2	31.0 - 62.9	38.5 – 77.8	45.0 - 50.7	12.5 - 77.8
Age (years) (mean, SD)	43.6 (11.0)	38.9 (9.0)	42.1 (10.3)	37.4 (10.4)	45.2 (10.1)	41.6 (10.5)
Min. – Max. (years)	24 - 70	25 - 67	23 - 68	24 - 63	27 - 70	23 - 70
Professional experience						
In current hospital (years) [mean (SD)]	12.3 (10.0)	7.4 (7.2)	7.8 (7.6)	5.4 (6.7)	10.8 (8.5)	8.9 (8.5)
Min. – Max. (years)	0 - 40	0 - 36	0 - 41	0 - 33	0 - 38	0 - 41
Overall (years) (mean SD)	17.4 (10.8)	11.0 (9.0)	17.1 (10.4)	12.5 (10.8)	17.2 (10.0)	15.2 (10.6)
Min. – Max. (years)	0 - 46	0 - 40	0 - 45	0 - 41	1 – 43	0 - 46

**Minimum and maximum values on hospital level*

2.3.2 Prevalence and patterns of physician care left undone

Physician care left undone ranged from a high of 55.3% (for 'Educate colleagues and students') to a low of 9.7% (for 'Pain management'), see Table 2-2. Some activities were especially frequently left undone in some countries, e.g. 'Educate colleagues and students' (72.0% in Ireland) and 'Comfort talk with patients' (71.5% Germany). There was a more than two-fold variation among countries in the items 'Adequate documentation of care', 'Timely response to concerns raised by nurses', 'Coordinate patient discharge planning', 'Coordinate patient care' and 'Ward rounds with nurses and other team members' (Table 2-2).

A large within-country variation is observed with almost all items, revealing differences between individual hospitals. Taking all items into account, the range for within-country variation is smallest in Scandinavia, ranging from 3.8 to 23.4 percent points.

On average, physicians left 3.1 (SD=1.0) activities undone in their most recently worked shift (Table 2-2). Overall, 78.3 % of physicians left one or more activities undone during their most recent shift while in both Germany and Ireland, less than 15% of the physicians indicated they left no activities undone (Table 2-2).

Table 2-2 - Prevalence of physician care left undone in six European countries [mean percentage, (min. – max on hospital level)]

Item	Belgium	Germany	England	Ireland	Scandinavia	TOTAL
Educate colleagues and students	44.4 (10 - 61.1)	59.4 (33.3 - 83.3)	59.8 (38.1 - 73.7)	72.0 (42.3 - 92.3)	39.4 (24.1 - 47.5)	55.3
Comfort/talk with patients	35.1 (10 - 50.6)	71.5 (41.7 - 100)	52.2 (30.4 - 80)	63.5 (30.8 - 82.4)	31.9 (27.8 - 39.4)	50.7
Adequate documentation of care	28.8 (0 - 44.1)	53.8 (18.8 - 75)	35.5 (23.8 - 70)	46.9 (26.9 - 62.1)	24.5 (20 - 28.8)	38.3
Develop/update patient plan of care pathways	41.0 (18.8 - 52.9)	29.5 (12.5 - 48.5)	31.3 (18.5 - 50)	34.4 (18.5 - 69.2)	24.5 (13.9 - 30.1)	32.5
Timely response to concerns raised by nurses	15.1 (0 - 26.5)	38.9 (18.8 - 57.1)	23.0 (11.9 - 50)	31.8 (18.2 - 53.8)	21.1 (15 - 28.4)	26.2
Review, update and prescribe medications	16.3 (0 - 36.8)	30.6 (12.5 - 47.8)	16.1 (8.7 - 40)	18.8 (8.3 - 25.3)	18.2 (15 - 21.1)	21.2
Coordinate patient care	13.6 (0 - 26.2)	20.8 (0 - 53.8)	21.6 (14.8 - 40)	25.6 (10 - 46.2)	13.0 (5.1 - 19.2)	19.1
Coordinate patient discharge planning	10.0 (0 - 26.3)	17.4 (0 - 34.8)	19.4 (8.7 - 30)	22.9 (7.7 - 40.5)	10.2 (7.3 - 12.5)	17.2
Ward rounds with nurses and other team members	11.6 (0 - 27.3)	25.4 (0 - 50)	12.6 (3.7 - 30)	19.2 (7.7 - 33.3)	4.9 (1.4 - 10)	16.3
Diagnose, treat, or provide care to inpatients	10.3 (0 - 21.1)	19.7 (7.1 - 30.4)	13.6 (5.3 - 20)	15.0 (0 - 30.8)	11.4 (7.5 - 16.4)	15.2
Pain management	7.3 (0 - 16.7)	9.7 (0 - 21.7)	14.0 (3.1 - 60)	12.5 (0 - 30.8)	4.0 (2.5 - 6.3)	9.7
Composite score						
Mean (SD)	2.3 (0.8)	3.8 (0.8)	3.0 (0.8)	3.6 (0.9)	2.0 (0.3)	3.1 (1.0)
Min. – Max.	0.4 - 3.4	1.9 - 5.1	2.3 - 5.4	2.1 - 5.3	1.7 - 2.3	0.4 - 5.3
At least one item left undone (%)	69.9	85.1	75.6	87.3	62.0	78.3
Min. – Max.	(30.0 - 89.2)	(62.5 - 100)	(57.1 - 100)	(63.0 - 100)	(53.2 - 67.1)	(30.0 - 100)

2.3.3 Physicians' reported quality of the work environment and perceived workload

Table 2-3 presents physicians' opinions on their work environment and workload. In Belgium, 76.1% of the physicians agreed that there were enough physicians to get the work done, compared to 30.3% in Ireland. Only 31.0% of all physicians agreed that there are enough nurses to get the work done, with similar values in all countries. In Germany, 54.7% of physicians agreed they have enough freedom to make important decisions about patient care and work, compared to Belgium and Scandinavia where more than 80% agreed that they had this level of autonomy. There were few differences with all other items related to the work environment.

More than 60% of physicians report they often or always have too much work to do and must work very fast. More than 70% of physicians report that they often or always must do many tasks simultaneously and are interrupted at work. This is similar in all countries.

Table 2-3 - Physicians' reports on work environment and workload

Work environment (*)	**BE**	**DE**	**EN**	**IE**	**SC**	**TOTAL**
A lot of teamwork between nurses and physicians	94.4	86.4	92.8	82.9	91.0	90.2
A supervisor who is a good manager and leader	78.4	66.2	80.9	72.9	83.1	76.3
Opportunities for advancement	75.0	76.9	78.5	66.1	77.4	75.5
Management that listens and responds to physicians' concerns	53.0	38.9	58.1	32.3	59.5	49.4
Physicians are involved in internal governance of the hospital	65.5	66.4	73.4	55.4	72.4	67.5
Enough physicians to get the work done	76.1	42.7	40.2	30.3	65.1	51.8
Enough nurses to get the work done	41.8	23.3	28.0	22.3	37.9	31.0
Freedom to make important patient care and work decisions	88.6	54.7	78.3	74.5	81.7	75.3
Not being placed in a position of having to do things that are against my medical judgment	84.7	67.8	80.9	68.1	83.7	77.6
Experience of Work/Perceived workload (**)						
Too much work to do	60.3	71.8	60.8	70.1	51.2	62.9
Work very fast	57.3	78.2	61.8	77.3	57.5	65.8
Interrupted at work	75.2	82.7	74.0	84.9	74.8	77.8
Do many tasks simultaneously	68.1	84.0	71.4	83.7	69.8	74.8

(*) % of physicians that strongly agree or agree that this item is present in their work environment.
(**) % of physicians that report always or often experiencing this.

2.3.4 Association between work environment, workload and physician care left undone

Table 2-4 reports the results of univariate and multiple regression analyses. In the univariate regression, the odds of leaving one or more activities undone is significantly higher when teamwork of nurses and physicians is categorised as poor versus good (OR 2.094, 95% CI 1.173 - 3.738). The odds to leave one or more activities undone is significantly higher in work environments where physician staffing and autonomy are categorised

as poor compared to good (OR 3.031, 95% CI 1.693 – 5.428 and OR 3.768, 95% CI 1.892 – 7.503 respectively) but also where both factors are categorised as mixed versus good (OR 2.092, 95% CI 1.335 – 3.281 and OR 1.994, 95% CI 1.311 – 3.032).

The odds to leave one or more activity undone significantly increases when physicians have too much work to do, have to work very fast, are interrupted at work, or have to do many tasks simultaneously. A 10% increase in physicians indicating they have too much work to do in a hospital significantly increases the odds of physician care being left undone (OR 1.414, 95% CI 1.268 – 1.578).

When combining the three work environment factors, the variable related to teamwork and the four workload variables in one model, aspects of the work environment being either poor versus good or mixed versus good did not significantly increase the odds of physician care being left undone. Only two variables related to physician workload; i.e. having too much work to do or being interrupted at work, significantly increase the odds of physician care being left undone in the multiple regression model. In Scandinavia, the odds of physician care being left undone were significantly lower compared to the other countries (OR 0.538, 95% CI 0.328 – 0.883). The odds of physician care being left undone or not decreased in physicians who had more experience in their current hospital (OR 0.967, 95% CI 0.954 – 0.979). The odds to leave one or more activities undone was lower for male than female physicians (OR 0.724, 95% CI 0.577 – 0.9088). When controlling for characteristics of the hospital, in this case hospital size and teaching status, the results of the multiple regression model remained the same (see Supplemental Material 2-3).

Table 2-4 - Association between physicians' organizational context (work environment and workload) and physician care left undone

	Simple regression		Multiple regression	
Covariates	**OR**	**95% CI**	**OR**	**95% CI**
Work environment				
Teamwork				
Poor vs. Good	2.094*	1.173 - 3.738	0.930	0.536 - 1.611
Mixed vs. Good	1.088	0.711 - 1.665	0.828	0.571 - 1.201
Job experience				
Poor vs. Good	1.813*	1.015- 3.239	1.229	0.750 - 2.012
Mixed vs. Good	1.079	0.710 - 1.640	1.147	0.838 - 1.570
Staffing				
Poor vs. Good	3.031*	1.693 - 5.428	1.158	0.607 - 2.210
Mixed vs. Good	2.092*	1.335 - 3.281	1.153	0.701 - 1.897
Autonomy				
Poor vs. Good	3.768*	1.892 - 7.503	1.207	0.553 - 2.635
Mixed vs. Good	1.994*	1.311 - 3.032	0.969	0.579 - 1.623
Workload				
Too much work to do	1.035*	1.024 - 1.047	1.020*	1.004 - 1.038
Work very fast	1.028*	1.012 - 1.045	0.994	0.972 - 1.015
Interrupted at work	1.043*	1.029 - 1.057	1.020*	1.002 - 1.039
Do many tasks simultaneously	1.044*	1.029 - 1.060	1.011	- 1.039

**Indicate statistical significance (p<0.05).*

Note: Adjusted for gender, years of experience in their current hospital and country. Estimated using a generalized linear mixed model with a random intercept for hospital.

2.3.5 Physician reported outcomes and measures

Physicians' outcomes and measures related to quality of care are reported in Table 2-5. In England more than 28.2% of physicians reported being burnt out, compared to only 10.8% in Belgium. There was a 27-point percent difference among countries in the percentage of physicians dissatisfied with their current job. More than 1 in 5 physicians in Ireland and Germany reported that the quality of medical care on their ward was poor or failing. The overall patient safety measure reported was poor or failing by 15% of physicians surveyed in England but only by 1.9% in Belgium (Table 2-5).

Table 2-5 - Physician reported outcomes and measures (absolute percentage)

Outcomes	BE	DE	EN	IE	SC	TOTAL
Emotional exhaustion	10.8	25.8	28.2	19.5	11.9	22.7
Dissatisfied with job	13.2	27.6	30.0	39.8	14.0	24.3
Poor or fair quality of medical care	8.6	21.3	18.3	20.7	10.0	15.7
Poor or failing safety grade for hospital	1.9	6.2	7.4	14.3	9.3	7.0

Leaving one or more activities undone was significantly associated with emotional exhaustion, job dissatisfaction, poor or failing quality of care and a poor or failing patient safety grade (see Table 2-6). When controlling for characteristics of the hospital, in this case hospital size and teaching status (included as fixed effect), the results of the regression model remained the same (see Supplemental Material 2-4).

When modelling medical activities left undone as a count variable, the odds of burnout significantly and progressively increase as the number activities are left undone increases. A similar pattern, although to a lesser extent, is observed for the odds of experiencing job dissatisfaction, rating the quality of care as poor or fair and rating the patient safety grade as failing or poor (see Supplemental Material 2-2). Again, also here when controlling for hospital size and teaching status (included as fixed effect), the results of the regression model remained the same (see Supplemental Material 2-5).

Table 2-6 - Association between any physician care left undone and emotional exhaustion, job dissatisfaction, and perceived quality of care

Physician outcomes	OR (95% CI)
Emotional exhaustion	3.867* (2.683 - 5.575)
Job dissatisfaction	2.208* (1.629 - 2.992)
Poor or fair quality of medical care	3.395* (2.215 - 5.204)
Failing or poor patient safety grade	2.618* (1.470 - 4.663)

*Indicates statistical significance ($p<0.05$).
Note: Adjusted for gender, years of experience in their current hospital and country. Estimated using a generalized linear mixed model with a random intercept for hospital.

2.4 DISCUSSION

This study measured the prevalence and patterns of physician care left undone in 56 acute care hospitals in Europe and related these findings to organizational context and physician outcomes, including self-reported measures for quality of care. This is the first study to explore these relationships in acute care hospitals worldwide.

We demonstrate that care left undone by physicians is prevalent. Similar patterns of care left undone are observed between countries. Items related to psychosocial care (e.g., “Comfort/talk with patients”) and documentation of care are most frequently left undone, while activities related to providing direct care and addressing the physical needs of patients, e.g. “Pain management” and “Ward rounds with nurses and other team members” are less frequently left undone. These patterns are relatively similar to those seen in similar studies of nursing care, both in single-[21] and multi-country studies.[16] A potential explanation for the observed patterns may lie in the time needed to complete these activities, how well the activities are structured[34] and the impact an activity has on the patients’ physical needs. The activities that are most left undone can be characterised as less structured (e.g. talking and comforting patients) and the time to complete them is difficult to predict. On the other hand, activities that are least left undone appear to be more structured in nature. Activities having a direct impact on patients’ physical needs also seem to receive the highest priority. Yet physicians spending less time with patients might negatively impact patients’ experiences and reduce their trust in physicians.

Work environment and workload, as antecedents of medical activities left undone, are both modifiable factors. The simple regression models indicated that working in hospitals where teamwork, staffing and autonomy are rated as poor significantly is associated with increased odds of medical activities being left undone. This association remains even when staffing and autonomy are rated as mixed compared to good. The multiple regression model reveals that the odds to leave care undone increases if physicians’ perceived workload increases. A potential explanation can be found when looking at the Job Demand Control model of Karasek.[35] The demands for physicians are high and their level of decision latitude often low, posing a high strain on physicians and potentially leads to care being left undone. These findings further strengthen the intuitive case for hospitals to invest in their work environment, building on evidence of a multiplicative effect of increased nurse staffing and good work environments.[36] An organisational intervention to improve work environment is the Magnet hospital recognition program through the American Nursing Credentialling Center (ANCC).[37] Magnet hospitals are recognized for the excellent nurse work environment, improved autonomy and improved patient care.[38,39] The Magnet Recognition Program of the ANCC primarily focuses on nursing excellence, but it is hypothesised that this hospital wide intervention not only improves nurse outcomes but can also be a catalyst for superior physician performance.[40]

We show how the ability to do their jobs impacts not just the quality of care that physicians deliver but also how satisfied they are with their jobs and their well-being. If they leave care undone physicians are more likely to rate patient safety adversely and experience negative outcomes like burnout and job dissatisfaction, themselves associated with poor patient outcomes. It is not just whether care is left undone that is important but also the number of care activities, with an incremental increase in the odds of burnout and job dissatisfaction. These findings resonate with findings from research focussing on nurses, where the effect of care left undone was associated with organizational outcomes like intention to leave and decreased job satisfaction.[41]

2.4.1 Limitations

Several limitations must be considered and merit attention when interpreting the findings. The data used in this study are cross sectional, limiting the opportunity to establish causal relationships. The survey took place during the COVID-19 pandemic which caused a major exogenous shock to healthcare systems worldwide, impacting hospitals and the health workforce in various ways. Most hospitals were experiencing high workloads and staffing shortages.[42] Some physicians reported for example a reduction in workload due the fact that many were not coming to the hospital and postponing their care.[43,44] Physicians working in intensive care settings and emergency care on the other hand experienced an increase in workload and patient acuity.[45,46] Physicians were often redeployed to different settings within the hospital to care for patients with COVID-19.[47,48] These exceptional circumstances may have obscured the prevalence of care left undone by physicians which under less exceptional conditions may be higher of lower.

The instrument to measure physician care left undone is a novel – investigator developed – instrument and relies on self-report of physicians. While the instrument is novel, it builds upon a substantial body of research in nursing – spanning over two decades - with instruments that have established strong predictive validity when used in various inpatient specialties.[14,18,49] Self-reported outcome assessments are prone to recall bias and social desirability bias. The risk of recall bias is low due to the recall period being very short (i.e. their most recent shift). Given the sensitive nature of the content and the fact that some physicians might find it controlling or conscientiously difficult to indicate which activities were left undone, while in fact they were expected to be performed, there might be a risk of providing socially desirable answers. In spite the potential bias induced by using a self-reported instrument, this method of self-reporting is predominantly used to evaluate care left undone and has demonstrated good validity in nursing research. Although direct observations of care left undone potentially provide a more accurate reflection of care left undone, they are labour intensive and prone to other types of bias (e.g. Hawthorne effect).

Hospitals participating in Magnet4Europe were self-selected as being committed to improving work environments leading to potentially underestimating the scale of care left undone by physician across European hospitals. Only six European countries were included in our sample and a low proportion of the

overall number of hospitals in each of the countries, limiting the interpretation of the observed differences within and between countries. The majority of the respondents come from Belgium, England and Germany, while less observations are available for Ireland and Scandinavia. Although these first three countries represent and exemplify the two main types of healthcare systems, i.e., Bismarck (Belgium and Germany) and Beveridge (England) it remains crucial to exercise caution when extrapolating these findings to a broader set of European countries as the current sample only encompasses a limited subset of European countries and is not representative for the region of Europe as a whole. This study is the first in its kind and generates an impetus for further research in Europe and the rest of the world.

There is considerable heterogeneity in physicians' work and work obligations depending on their speciality and setting in which they are active. The findings in this study are therefore limited to physicians working in medical, surgical, and intensive care and emergency care settings in acute care hospitals and cannot be generalized to physicians in different settings. Despite limiting the sample to physicians active in these settings, those physicians represent the largest share of physicians in hospitals. We also did not study whether the same associations persist across morning, day and night shifts, or across shifts with different lengths. In this study we evaluated the association between physician care left undone and physician reported outcomes. Evidence from nursing research however demonstrated that leaving care undone is also associated with decreased patient satisfaction and increased odds of patients dying in-hospital following common surgical procedures, making care left undone a highly useful and easy performance measure for hospitals to monitor. In this study we did not evaluate the impact of care left undone by physicians on patient satisfaction or patient outcomes.

The response rate to the survey was low, posing a potential threat to the internal validity and limiting the generalisability of the findings. In addition, due to the low response rate, the results are susceptible to suffer from selection bias, potentially and inadvertently leading to having physicians with more outspoken views and opinions, both positive and negative. The observed low response rate may be attributed to the phenomenon of survey fatigue, which has been exacerbated by the COVID-19 pandemic.[50] However, the overall sample size is large (1 963) and on average there are 35 observations per hospital, ranging from 25 in Ireland to 75 in Scandinavia.

2.4.2 Implications for practice and future research

Hospital work environments and the physician workload are modifiable and can be influenced by healthcare organisations. Having a high-quality work environment and balanced workload are essential if physicians are to provide high quality, safe patient care. However, how this can be achieved and sustained requires much further study.

Future research should focus on identifying organizational interventions that are most effective in enabling physicians to perform all their medical activities in a timely manner. Expanding the sample of physicians as well as different settings in which physicians are active would also be relevant for future studies evaluating physician care left undone. The evaluation and development of instruments and measures to better understand and quantify physician staffing levels also merits attention in future research. Qualitative research can be used to shed light and further explore physicians' experiences when not being able to provide care consistent with their professional values. Finally, evaluating the association between physician care left undone and patient outcomes is important to unveil if physician care left undone can also serve as early warning indicator for higher risk of poor patient outcomes.

2.5 CONCLUSION

Care left undone by physicians across European hospitals is prevalent. Leaving care undone primarily results from having a high workload and negatively impacts physicians' well-being and perceived quality of care. Hospitals must prioritize the availability of sufficient healthcare personnel resources to mitigate the occurrence of care left undone by physicians.

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Supplemental Material

Supplemental Material 2-1:- Exploratory factor analysis of the physician work environment scale

Supplemental Material 2-2: Association of physician care left undone (as count variable) with physician-reported burnout, job dissatisfaction and perceived quality of care

Supplemental Material 2-3: Association between physicians' organizational context (work environment and workload) and physician care left undone

Supplemental Material 2-4: Association between any physician care left undone and emotional exhaustion, job dissatisfaction, and perceived quality of care

Supplemental Material 2-5: Association of physician care left undone (as count variable) with physician-reported burnout, job dissatisfaction and perceived quality of care

Supplemental Table 2-1 - Exploratory factor analysis of the physician work environment scale

Work environment (*)	**F1**	**F2**	**F3**
A lot of teamwork between nurses and physicians			
A supervisor who is a good manager and leader	0.701*		
Opportunities for advancement	0.807*		
Management that listens and responds to physicians' concerns	0.727*		
Physicians are involved in internal governance of the hospital	0.626*		
Enough physicians to get the work done		0.580*	
Enough nurses to get the work done		0.902*	
Freedom to make important patient care and work decisions			0.666*
Not being placed in a position of having to do things that are against my medical judgment			0.789*

* Indicates statistical significance

Model fit information: comparative fit index = .977; Tucker-Lewis index = .932; root mean square error of approximation = .093; standardized root mean square residual = .022

Supplemental Table 2-2 - Association of physician care left undone (as count variable) with physician-reported burnout, job dissatisfaction and perceived quality of care

Number of activities left undone	Emotional exhaustion		Quality of care		Patient safety grade		Job dissatisfaction	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
1 versus 0	1.303	0.720 - 2.357	0.588	0.588 - 2.457	0.278	0.278 - 2.293	0.851	0.851 - 2.231
2 versus 0	**3.086***	1.977 - 4.816	0.821	0.821 - 2.609	0.923	0.923 - 4.151	0.813	0.813 - 1.874
3 versus 0	**3.264***	**2.100 - 5.075**	**1.478***	**1.478 - 4.19**	**1.025***	**1.025 - 4.44**	**1.418***	**1.418 - 3.054**
4 versus 0	**3.672***	**2.329 - 5.789**	**2.527***	**2.527 - 7.021**	**1.892***	**1.892 - 7.721**	**1.973***	**1.973 - 4.347**
5 versus 0	**5.793***	**3.596 - 9.330**	**2.749***	**2.749 - 8.122**	**1.429***	**1.429 - 6.762**	**2.089***	**2.089 - 4.949**
6 versus 0	**8.321***	**4.855 - 14.260**	**4.583***	**4.583 - 14.819**	**1.546***	**1.546 - 8.564**	**1.695***	**1.695 - 4.758**
7 versus 0	**9.367***	**5.033 - 17.433**	**3.479***	**3.479 - 13.593**	**1.272***	**1.272 - 10.433**	**2.016***	**2.016 - 6.699**
8 versus 0	**8.841***	**4.185 - 18.678**	**4.366***	**4.366 - 20.816**	**2.813***	**2.813 - 23.762**	**1.687***	**1.687 - 7.398**
9 or more versus 0	**6.169***	**3.569 - 10.664**	**4.441***	**4.441 - 14.308**	**3.035***	**3.035 - 15.379**	**1.995***	**1.995 - 5.454**

* Indicates statistical significance

Note: Adjusted for gender, years of experience in their current hospital and country. Estimated using a generalized linear mixed model with a random intercept for hospital.

Supplemental Table 2-3 - Association between physicians' organizational context (work environment and workload) and physician care left undone

	Simple regression		Multiple regression	
Covariates	**OR**	**95% CI**	**OR**	**95% CI**
Work environment				
Teamwork				
Poor vs. Good	1.417	0.753-2.665	0.792	0.435-1.442
Mixed vs. Good	1.003	0.670-1.502	0.769	0.520-1.136
Job experience				
Poor vs. Good	**1.743***	**1.061-2.861**	1.277	0.763-2.136
Mixed vs. Good	0.962	0.683-1.355	1.100	0.801-1.511
Staffing				
Poor vs. Good	**2.510***	**1.329-4.740**	1.312	0.655-2.627
Mixed vs. Good	**1.756***	**1.041-2.962**	1.266	0.743-2.158
Autonomy				
Poor vs. Good	**3.057***	**1.498-6.239**	1.183	0.536-2.612
Mixed vs. Good	1.609	0.980-2.642	0.968	0.554-1.690
Workload				
Too much work to do	**1.031***	**1.020-1.043**	**1.022***	**1.004-1.040**
Work very fast	**1.023***	**1.009-1.037**	0.992	0.971-1.013
Interrupted at work	**1.039***	**1.023-1.055**	**1.019***	**1.000-1.038**
Do many tasks simultaneously	**1.038***	**1.022-1.055**	1.012	0.984-1.041

*Indicate statistical significance (p<0.05).

Note: Adjusted for gender, years of experience in their current hospital, country, hospital size and hospital teaching status. Estimated using a generalized linear mixed model with a random intercept for hospital.

Supplemental Table 2-4 - Association between any physician care left undone and emotional exhaustion, job dissatisfaction, and perceived quality of care

Physician outcomes	OR (95% CI)
Emotional exhaustion	**3.879* (2.689-5.597)**
Job dissatisfaction	**2.180* (1.609-2.953)**
Poor or fair quality of medical care	**3.389* (2.211-5.193)**
Failing or poor patient safety grade	**2.632* (1.475-4.695)**

*Indicate statistical significance ($p<0.05$).

Note: Adjusted for gender, years of experience in their current hospital, country, hospital size and hospital teaching status. Estimated using a generalized linear mixed model with a random intercept for hospital.

Supplemental Table 2-5 - Association of physician care left undone (as count variable) with physician-reported burnout, job dissatisfaction and perceived quality of care

Number of activities left undone	Emotional exhaustion		Quality of care		Patient safety grade		Job dissatisfaction	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
1 versus 0	1.313	0.725 - 2.376	1.229	0.602 - 2.509	0.799	0.278 - 2.295	1.375	0.850 - 2.225
2 versus 0	**3.120***	**1.996 - 4.878**	1.469	0.823 - 2.620	1.951	0.920 - 4.139	1.216	0.801 - 1.846
3 versus 0	**3.288***	**2.113 - 5.116**	**2.502***	**1.485 - 4.214**	**2.125***	**1.021 - 4.425**	**2.048***	**1.396 - 3.005**
4 versus 0	**3.686***	**2.335 - 5.819**	**4.203***	**2.520 - 7.011**	**3.778***	**1.871 - 7.629**	**2.864***	**1.929 - 4.250**
5 versus 0	**5.767***	**3.577 - 9.298**	**4.640***	**2.699 - 7.976**	**3.064***	**1.409 - 6.660**	**3.152***	**2.050 - 4.847**
6 versus 0	**8.342***	**4.862 - 14.313**	**8.373***	**4.658 - 15.051**	**3.673***	**1.561 - 8.643**	**2.818***	**1.685 - 4.712**
7 versus 0	**9.378***	**5.033 - 17.472**	**6.883***	**3.485 - 13.593**	**3.629***	**1.269 - 10.376**	**3.612***	**1.984 - 6.577**
8 versus 0	**8.966***	**4.225 - 19.026**	**9.743***	**4.465 - 21.259**	**8.207***	**2.820 - 23.883**	**3.479***	**1.659 - 7.295**
9 or more versus 0	**6.261***	**3.617 - 10.839**	**8.028***	**4.470 - 14.420**	**6.812***	**3.028 - 15.323**	**3.236***	**1.958 - 5.346**

*Indicate statistical significance ($p<0.05$).

Note: Adjusted for gender, years of experience in their current hospital, country, hospital size and hospital teaching status. Estimated using a generalized linear mixed model with a random intercept for hospital.

CHAPTER 3

EXPLORING THE RELATIONSHIP BETWEEN JOB CHARACTERISTICS AND CARE LEFT UNDONE AMONG NURSES AND PHYSICIANS IN EUROPE: A MULTILEVEL LATENT CLASS ANALYSIS

This chapter is submitted for publication as:

Dello, S., Kohnen, D., De Witte, H., Schaufeli, W., Bruyneel, L., Aiken, L., McKee, M., Sermeus, W. (2025). Exploring the relationship between job characteristics and care left undone among nurses and physicians in Europe: A multilevel latent class analysis. *Human Resources for Health* [under review]

ABSTRACT

Background - The interplay between job demands and job resources yields four job profiles, as described in Karasek's Job-Demand Control model. High job demands with few job resources create high-strain jobs linked to burnout and low engagement, whereas high job demands with abundant job resources produce active jobs that foster engagement. This study aimed to determine the prevalence of these job profiles among both nurses and physicians, within hospitals, and to assess their associations with job outcomes.

Methods - A multicentre, multinational cross-sectional survey involving 5740 nurses and physicians in 57 hospitals in six European countries was conducted. Multilevel latent class analysis identified latent job profiles and latent hospital groups. Associations between latent job profiles and job outcomes were analysed using logistic and linear mixed-effects models.

Results - At the individual level, high-strain jobs (40%) were most prevalent, followed by active jobs (30%), and passive and low-strain jobs (15% each). Four latent hospital groups emerged. High-strain jobs predominated in larger teaching hospitals for both nurses and physicians. Nurses in smaller non-teaching hospitals were more likely to hold high-strain jobs, whereas physicians in these hospitals were more likely to hold active or low-strain jobs. Individuals in high-strain jobs left more clinical (β=0.1612, $p<0.0001$) and administrative tasks undone (β=0.1547, $p<0.0001$), had higher odds of burnout (OR 2.59, 95% CI 2.29–2.93) and intention to leave (OR 2.30, 95% CI 1.89–2.79).

Conclusions - High-strain jobs are widespread and associated with adverse job outcomes. Hospital characteristics critically shape job profiles, underscoring the importance of organisational design in reducing job strain and supporting workforce sustainability.

3.1 INTRODUCTION

In the past two decades, patient safety has become a central concern in healthcare, driven by seminal reports emphasising the need for safer systems.[1,2] This shift underscored the importance of work environments that enable nurses and physicians to perform optimally - benefiting staff, patients, and organisations alike.[3] However, the mental health and well-being of healthcare professionals are under increasing strain, with high burnout rates reported worldwide [4,5]. Burnout is associated with reduced job performance,[6–8] more medical errors, and poorer patient care quality, [9,10] trends intensified by the COVID-19 pandemic. Importantly, the leading causes of burnout lie within organisational structures rather than individual shortcomings.[11,12]

The Job Demands–Resources (JD-R) model provides a widely used framework to understand how job characteristics influence wellbeing. Job demands, such as heavy workloads and systemic inefficiencies, deplete energy, while resources such as supportive leadership, autonomy, and teamwork, help sustain motivation.[13–15] When demands exceed available resources, burnout occurs; when resources are sufficient, they buffer stress and foster engagement even under high pressure.[16] Addressing burnout, therefore, requires systemic redesign of work environments to balance demands and resources, supporting both staff wellbeing and patient safety.

Most studies applying the JD-R model assess the direct effects of demands and resources on outcomes.[17] This study, however, adopts a person-centred approach using Latent Class Analysis (LCA)[18,19] to identify job profiles based on Karasek's Job Demand–Control framework.[13] "High-strain" jobs, characterised by high demands and limited resources, are linked to burnout, whereas "active" jobs, combining high demands with high resources, promote engagement.[20] "Low-strain" roles (low demands, high resources) offer stability, while "passive" jobs (low demands, low resources) may lead to stagnation.[21] Workplace features further influence these profiles: effective leadership enhances autonomy and engagement, while inadequate staffing and conflict increase workload and strain, undermining safety and well-being.[22] Excessive workloads and constrained care drive burnout and attrition among nurses and physicians.[23,24]

With the World Health Organization projecting a 14-million healthcare worker shortfall by 2030,[25,26] improving retention is essential. Although nurses and physicians share work environments, they face distinct demands and resources, as highlighted by Glouberman and Mintzberg's framework: while both groups share structural elements, their roles, autonomy, and interactions differ significantly.[27,28] Given the limited evidence on the distribution of these job profiles, mapping them can guide targeted interventions.

This study explores job profile distributions among nurses and physicians in European acute care hospitals and examines their associations with burnout, care left undone, and intention to leave. We hypothesise that most participants belong to high-strain profiles (H1a), that profile distributions differ between nurses and physicians (H1b), and that those in high-strain profiles report more care left undone, higher burnout, and stronger intentions to leave (H2a-b).

3.2 METHODS

3.2.1 Design, setting and sample

This paper uses cross-sectional data from the EU-funded *Magnet4Europe* project,[29] a cluster randomised controlled trial assessing how organisational redesign in hospitals impacts nurse and physician well-being. The intervention, based on the *Magnet©* concept, aims to create work environments that attract and retain nursing staff. Details are available elsewhere.[29] The findings presented here are from the second survey conducted between May and August 2022.

3.2.2 Latent class indicators and covariates

3.2.2.1 Job demands and resources (individual-level indicators)

All survey instruments were translated into Dutch, English, German, Norwegian and Swedish. The measures of job demands and resources were consistent for nurses and physicians. Job demands were assessed with selected items from the Questionnaire on the Experience and Evaluation of Work (QEEUW).[30,31] This included four workload items and one on bureaucratic obstacles (“red tape”), all on a 5-point Likert scale from 1 (never) to 5 (always).

The response scales for job resource items varied based on their source. Items from the PES-NWI were measured on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree), while items from the other sources used a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). For this analysis, both scales were dichotomised. Responses of somewhat agree (3) and strongly agree (4) on the 4-point scale were coded as 1, while all other responses were coded as 0. Similarly, for the 5-point scale, responses of agree (4) and strongly agree (5), or often (4) and always (5), were coded as 1, with all other responses coded as 0.

3.2.2.2 Individual-level covariates

Individual-level covariates include whether the individual is a nurse or a physician.

3.2.2.3 Group level covariates

Three covariates were included: country, hospital size (small, medium, large), and teaching status (teaching versus non-teaching). Hospital size categorised: small (<500 beds), medium (500-1000 beds) and large (>1000 beds).

3.2.3 Outcomes

3.2.3.1 Care Left Undone

Care left undone was assessed for both nurses and physicians using a scale adapted from the Tasks Undone scale.[32] Respondents were asked: “On the most recent shift you worked, which of the following (medical) activities were necessary but left undone (fully or partially) because of time constraints?” They were then presented with a checklist allowing them to mark any tasks left incomplete or “None of the above if no care was left undone.” A complete list of items for both scales is available in Supplemental Material 3-1.

3.2.3.2 Burnout

Burnout was assessed using the 12-item short version of the Burnout Assessment Tool (BAT), which measures core burnout symptoms such as exhaustion, mental distance, and emotional and cognitive impairment.[33,34] Each item of the BAT is scored on a 5-point Likert scale, with anchors from never (1) to always (5). The average score of the 12 items was calculated at the individual level and then categorised into three groups based on pooled cut-off scores identified by Schaufeli et al. (2023): respondents with no burnout (mean BAT score < 2.54), those at risk of burnout (mean BAT score between 2.54–2.96), and those experiencing burnout (mean BAT score ≥ 2.96).[35]

3.2.3.3 Intention to leave

Intention to leave was assessed with a single-item measure that asked respondents: “Would you leave your current hospital within the next year due to job dissatisfaction?” Respondents could answer with a dichotomous response: “yes” (1) or “no” (0).

3.2.4 Analysis

Sample characteristics were summarised using means and standard deviations for continuous variables and frequencies and proportions for categorical variables. Confirmatory factor analyses (CFA) with robust maximum likelihood estimation were conducted using the lavaan package to confirm the dimensionality of study variables [36]. Separate CFAs were run for (1) job demands/resources, (2) care left undone, and (3) burnout. For burnout, CFA validated the Burnout Assessment Tool (BAT) structure. The BAT conceptualises burnout as a syndrome, yielding a composite score and four subscale scores.[37] Only the composite mean score was used in the analysis.

Because nurses and physicians are nested within hospitals, the data are hierarchical, violating the independence assumption of traditional LCA. We therefore used multilevel LCA, which accounts for nested structures and identifies latent classes at individual and group levels. This approach follows Di Mari et al.[38] Their approach first estimates the measurement model to identify latent classes, then

incorporates covariates to predict class membership, thereby addressing the challenges posed by hierarchical data structures.

We used the multilevLCA package in R to extract homogeneous latent classes of nurses and physicians based on perceptions of job demands and resources, and to classify hospitals by the distribution of these profiles.[38] The analysis used a random-effects multilevel LCA framework, in which the lower-level latent variable Xij (individual latent class) was conditioned on the higher-level latent variable Wj (hospital-level latent class). A two-step estimation process was used. Stage 1 included: (1a) fitting a single-level latent class model without covariates; (1b) fitting a multilevel model without covariates, fixing measurement parameters from Step 1a; (1c) if interaction effects existed, re-estimating the multilevel model while keeping high-level class proportions fixed. Stage 2 mirrored the second step of the initial two-step approach. Model fit was assessed using the Bayesian Information Criterion (BIC): low-level BIC identified the optimal number of individual classes in Steps 1a and 1c, while high-level BIC indicated the optimal number of hospital-level classes in Step 1b.[38]

Following MLCA, we conducted post hoc analyses to examine relationships between individual-level latent classes and outcomes: care left undone, burnout, and intention to leave, while accounting for hospital-level latent groups. Multilevel models included hospital group as a random intercept. A multilevel linear mixed-effects model (REML) was used to assess care left undone across job profiles and professions. Burnout (ordinal) was analysed using a cumulative link mixed model (CLMM) with a probit link, estimating cumulative probabilities across burnout categories. Intention to leave was modelled using a generalised linear mixed model with a logit link. Analyses began with random-intercept-only models to partition variance, then added fixed effects and explored interactions. Gender and tenure were included in all intermediate and full models. All analyses were performed in R (v4.2.2; R Core Team 2021).[39]

3.2.5 Ethics approval

The Magnet4Europe study is funded by the EU under the H2020 Research and Innovation Programme (Grant Agreement No. 848031). Ethics approval has been obtained from the central ethics committees in each participating country.

3.3 RESULTS

3.3.1 Descriptive results

Table 3-1 presents descriptive statistics for the study sample. Most participants were female nurses, while physicians were evenly split by sex. Overall, 40% of observations came from individuals working in German hospitals, for both nurses and physicians.

Table 3-1 - Sample characteristics

Characteristics	Total (n=5 740)	Nurses (n=4 220)	Physicians (n=1 520)
Sex			
Female	4 208 (73.3%)	3 470 (82.2%)	738 (48.6%)
Male	1 532 (26.7%)	750 (17.8%)	782 (51.4%)
Age (mean, SD)	39.3 (11.2)	38.5 (11.4)	41.4 (10.5)
Tenure (mean, SD)	14.7 (11.2)	14.8 (11.4)	14.6 (10.5)
Primary setting			
Surgical	1 284 (22.4%)	884 (20.9%)	400 (26.3%)
Internal medicine	1 951 (34.0%)	1 284 (30.4%)	667 (43.9%)
ICU/ER	1 574 (27.4%)	1 314 (31.1%)	260 (17.1%)
Other	931 (16.2%)	738 (17.5%)	193 (12.7%)
Teaching status hospital			
Non-teaching	1 652 (28.8%)	1 303 (30.9%)	349 (23.0%)
Teaching	4 088 (71.2%)	2 917 (69.1%)	1 171 (77.0%)
Hospital size			
Small (<500)	914 (15.9%)	659 (15.6%)	255 (16.8%)
Medium (500-1 000)	2 455 (42.8%)	1 825 (43.2%)	630 (41.4%)
Large (>1000)	2 371 (41.3%)	1 736 (41.1%)	635 (41.8%)
Country			
Belgium	1 239 (21.6%)	983 (23.3%)	256 (16.8%)
Germany	2 249 (39.2%)	1 627 (38.6%)	622 (40.9%)
Ireland	666 (11.6%)	482 (11.4%)	184 (12.1%)
England	981 (17.1%)	728 (17.3%)	253 (16.6%)
Scandinavia	605 (10.5%)	400 (9.5%)	205 (13.5%)

Note: all percentages in Table 1 represent column percentages

3.3.2 Dimensionality measurement scales

The results from the Confirmatory Factor Analysis (CFA) indicated a good fit for the proposed job demands and job resources measurement scale, with $\chi2(68)=1146.9$, CFI=0.948, TLI=0.931, RMSEA=0.054, and SRMR=0.047. For care left undone, CFA for the nursing scale showed good fit: $\chi^2(51)=589.5$, CFI=0.953, TLI=0.939, RMSEA=0.049, SRMR=0.037. "Coordinate discharge planning" was excluded for low contribution. The physician scale also showed a robust model fit: $\chi^2(26)=71.4$, CFI=0.981, TLI=0.974, RMSEA=0.034, SRMR=0.024, with "Educating colleagues and students" and "Comforting/talking to patients" removed. Both scales supported a two-factor structure, clinical activities and administrative tasks, consistent with prior research [40].

A second-order CFA for the BAT was estimated, representing burnout as a syndrome of four interrelated symptoms referring to one underlying condition. The four first-order factors (exhaustion, mental distance, emotional and cognitive impairment) loaded on three observed items each and one higher-order factor loaded on the four first-order factors. The fit indices showed acceptable model fit ($\chi2(50)=1110.35$, CFI=0.974, TLI=0.966, RMSEA=0.061, and SRMR=0.052). All first-order factor loadings were significant; the second-order factor loaded strongly on first-order factors, indicating the four dimensions are explained by a single higher-order construct.[41]

3.3.3 Multilevel Latent Class Analysis

3.3.3.1 Latent structure and model fit

The MLCA yielded a final model with four individual-level latent classes and four hospital-level groups. Lower-level classes represent distinct job profiles based on probabilities of encountering various demands and resources (Table 3-2). Classification performance was strong, with entropy-based R^2 of 0.7503 (individual) and 0.8591 (hospital), indicating well-separated classes, especially at the hospital level. Fit indices supported model adequacy: BIC = 86,919.06 (individual) and 86,536.25 (hospital) (ICL-BIC = 90,641.97 and 86,558.33; AIC = 86,366.68). These statistics confirm robust classification and reliable differentiation of latent groups.

3.3.3.2 Individual-level profiles

Table 3-2 presents the individual-level response probabilities for each identified latent class. The distribution of latent job profiles across demographic and organisational characteristics is summarised in Table 3-3.

Among all individuals, 40% had a high-strain job profile (C3), supporting hypothesis 1a. Active jobs were next most common (30%), while passive and low-strain profiles each accounted for 15%. Profile distribution did not differ significantly by gender ($\chi^2(3)=1.817$, p=0.6112) or occupation ($\chi^2(3)=6.28$,

p=0.098). Significant differences were observed by setting ($\chi^2(9)=54.288$, $p<0.001$), teaching status ($\chi^2(3)=24.499$, $p<0.001$), and hospital size ($\chi^2(6)=56.855$, $p<0.001$).

Table 3-2 - Individual-level response probabilities across four latent classes

ITEMS	**Individual-level response probabilities**			
Job demands	**Active job (C1)**	**Low strain job (C2)**	**High strain job (C3)**	**Passive job (C4)**
Have too much work to do	0.8666	0.2135	0.9455	0.2742
Have to work very fast	0.9208	0.2742	0.9776	0.3257
Interrupted at work	0.8559	0.3297	0.9566	0.5833
Have to do many tasks simultaneously	0.9434	0.2789	0.9841	0.5084
Red tape	0.2458	0.0339	0.5261	0.1757
Job resources				
Staff feels free to question the decisions or actions of those in authority	0.5093	0.6023	0.2994	0.3356
The actions of management show that patient safety is a top priority	0.5917	0.7405	0.1258	0.2285
Supervisor provides information on job performance	0.4126	0.5021	0.2387	0.2157
Much teamwork between nurses and physicians	0.9228	0.9604	0.7144	0.8138
A supervisor who is a good manager and leader	0.9412	0.9749	0.5470	0.6140
Opportunities for advancement	0.9221	0.9432	0.5291	0.5705
Management that listens and responds to nurses' concerns	0.7909	0.9257	0.0919	0.1812
Nurses are involved in internal governance of the hospital	0.7934	0.8714	0.3627	0.4354
Freedom to make important patient care and work decisions	0.7479	0.9416	0.3766	0.6153

Note: Active jobs (C1) are characterised by high levels of job demands and job resources. Low-strain jobs (C2) have low job demands paired with high job resources. High-strain jobs (C3) are defined by high job demands and low job resources, especially in autonomy and organisational involvement. Passive jobs (C4) feature moderate job demands with low job resources.

3.3.3.3 Individual-level profile probabilities and distribution across latent hospital groups

Table 3-4 shows individual-level class membership probabilities within each latent hospital group, along with hospital characteristics (size, teaching status). Figure 3-1 illustrates the distribution of job profiles for nurses and physicians across these groups. As no theoretical framework existed for naming hospital groups, labels were based on observed patterns of individual-level profiles.

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Table 3-3 - Bivariate distribution of latent job profiles across individual and hospital-level characteristics

	LATENT JOB PROFILES				
	Active job (C1) (n)=1 826	**Low strain job (C2) (n)=811**	**High strain job (C3) (n)=2 270**	**Passive job (C4) (n)=833**	**F-values**
Age (mean)	39.2	40.1	38.7	40.0	F(3, 5 736) = 4.707, p=0.002
Tenure (mean)	14.9	15.3	14.3	15.5	F(3, 5 736) = 3.447, p=0.015
					χ2-values
Gender					χ2(3)=1.817 (p=0.6112)
Female	1 346 (32.0%)	591 (14.0%)	1 675 (39.8%)	596 (14.2%)	
Male	480 (31.3%)	220 (14.4%)	595 (38.8%)	237 (15.5%)	
Occupation					χ2(3)=6.28 (p=0.098)
Nurse	1 313 (31,2%)	616 (14,6%)	1 664 (39,5%)	627 (14,9%)	
Physician	513 (33,8%)	195 (12,8%)	606 (39,8%)	206 (13,6%)	
Setting					χ2(9)=54.288 (p<0.001)
Surgical	416 (32.4%)	173 (13.5%)	510 (39.7%)	185 (14.4%)	
Internal medicine	663 (34.0%)	287 (14.7%)	758 (38.9%)	243 (12.5%)	
ICU/ER	462 (29.4%)	175 (11.1%)	680 (43.2%)	257 (16.3%)	
Other	285 (30.6%)	176 (18.9%)	322 (34.6%)	148 (15.9%)	
Teaching status					χ2(3)=24.499 (p<0.001)
Non-teaching	921 (31.7%)	473 (16.3%)	1 097 (37.8%)	412 (14.2%)	
Teaching	905 (31.9%)	338 (11.9%)	1 173 (41.3%)	421 (14.8%)	
Hospital size					χ2(6)=56.855 (p<0.001)
Small (<500)	312 (34.1%)	192 (21.0%)	300 (32.8%)	110 (12.0%)	
Medium (500-1 000)	781 (31.8%)	325 (13.2%)	988 (40.2%)	361 (14.7%)	
Large (>1000)	733 (30.9%)	294 (12.4%)	982 (41.4%)	362 (15.3%)	

Note: all percentages in Table 3 represent row percentages

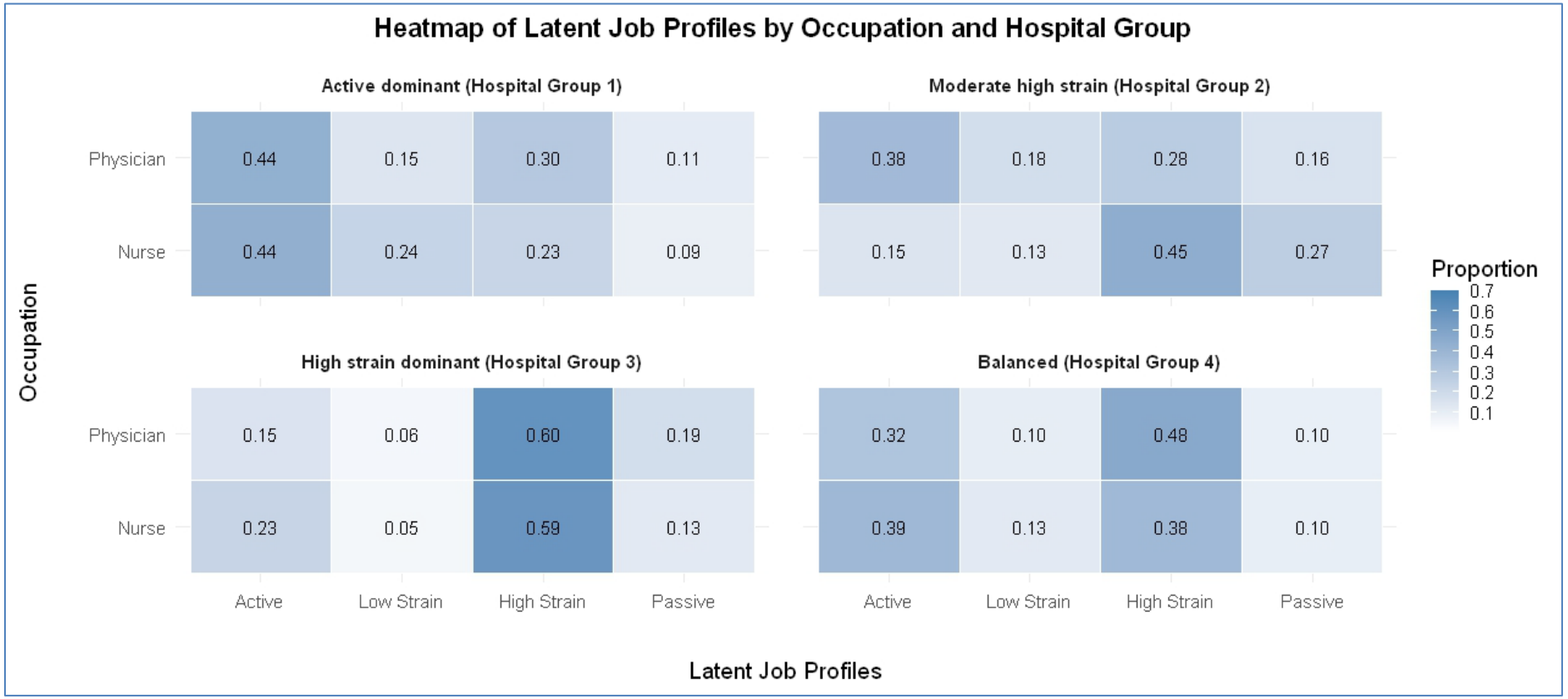

Figure 3-1 - Heatmap illustrating the proportion of individual-level latent job profiles by occupation for each of the four latent hospital types. Differences in the observed distribution of latent profiles within hospital groups were assessed using chi-square test

Logistic regression models revealed significant differences in class membership by profession (hypothesis 1b; detailed estimates in Supplemental Tables 3-2 & 3-3). Active jobs dominate group 1 and include the smallest hospitals; physicians were less likely than nurses to hold low-strain jobs ($\chi^2(3)=20.17$, $p=0.0001$). High-strain profiles prevail in the moderate-high-strain and high-strain-dominant groups; the former has the fewest teaching hospitals, while the latter has the most. In Group 2, nurses were more likely to experience high strain, while physicians were more likely to have active jobs ($\chi^2(3)=112.23$, $p<0.0001$). In the high-strain dominant group, both professions report high strain, but nurses lean toward active profiles, whereas physicians lean toward passive profiles ($\chi^2(3)=12.015$, $p=0.0073$). Group 4 shows a balanced distribution of active and high-strain jobs for both professions ($\chi^2(3)=10.625$, $p=0.0139$) and a high proportion of teaching hospitals, similar to group 3.

Table 3-4 – Distribution of individual-level class membership and hospital characteristics across latent hospital groups

	LATENT HOSPITAL GROUPS			
	Active dominant	**Moderate high strain**	**High strain dominant**	**Balanced**
	G1 (n=17)	**G2 (n=15)**	**G3 (n=12)**	**G4 (n=13)**
P(C1|G)	0.4289	0.2117	0.2242	0.3712
P(C2|G)	0.2169	0.1469	0.056	0.1178
P(C3|G)	0.2474	0.3956	0.5687	0.3976
P(C4|G)	0.1068	0.2458	0.1511	0.1134
Teaching hospital	10 (25%)	7 (18%)	11 (28%)	12 (30%)
Hospital size				
Small (<500)	6 (46%)	4 (31%)	1 (8%)	2 (15%)
Medium (500-1000)	7 (26%)	6 (22%)	7 (26%)	7 (26%)
Large (>1000)	4 (24%)	5 (29%)	4 (24%)	4 (24%)

Note: all percentages in Table 4 represent row percentages

3.3.4 Association between latent job profile and outcomes

3.3.4.1 Care left undone

From the unconditional means model, ICC indicated that 11% (F1) and 12% (F2) of variance was due to between-hospital group differences, with 89% and 88% within-group. Table 3-5 summarises linear mixed-effects models examining both care left undone factors and latent job profiles, with occupation (fixed effects) and hospital group as random effects. Patterns were similar for both factors: individuals in high-strain or active jobs reported significantly more care left undone than those in passive jobs. For F1 and F2, high strain showed $\beta=0.1612$, $p<0.0001$, $d=0.659$ and $\beta=0.1547$, $p<0.0001$, $d=0.703$; active jobs showed $\beta=0.0448$, $p<0.0001$, $d=0.184$ and $\beta=0.0692$, $p<0.0001$, $d=0.254$ (hypothesis 2a). Post-hoc

pairwise comparisons confirmed significant differences across all four job profiles (Bonferroni-adjusted p<0.0001). No significant difference was found between nurses and physicians (hypothesis 2b).

3.3.4.2 Burnout

Table 3-6 shows results from the multilevel ordinal logistic regression. Both threshold coefficients separating burnout categories ("no burnout" vs "at risk" and "at risk" vs "burned out") were significant. Estimates apply to both thresholds and reflect cumulative probability across categories. Model 1 revealed individuals in high-strain jobs had greater odds of being at risk or burned out than those in passive jobs (OR=2.39, 95% CI 2.15–2.66) (hypothesis 2a). Low-strain jobs had lower odds (OR=0.47, 95% CI 0.40–0.55), while active jobs did not differ significantly from passive. Physicians had lower odds than nurses (OR=0.82, 95% CI 0.76–0.89) (hypothesis 2b). Model 2 with interaction terms confirmed consistency across profiles, including physicians in high-strain jobs. The null model showed that most of the variance was within hospital groups (ICC=0.09), similar to care left undone.

3.3.4.3 Intention to leave

Table 3-6 reports results from the complete model (Model 2) using a generalised linear mixed model. Individuals in active or low-strain jobs had significantly lower odds of leaving their organisation than those in passive roles (OR=0.63, 95% CI 0.51–0.78; OR=0.25, 95% CI 0.19–0.34). Conversely, high-strain jobs were associated with higher odds of leaving (OR=2.30, 95% CI 1.89–2.79) (hypothesis 2a). In the intermediate model (Model 1), physicians had lower odds of intending to leave than nurses (OR=0.63, 95% CI 0.54–0.73) (hypothesis 2b). Interaction terms showed that physicians' intention to leave remained lower in active or low-strain jobs, but in high-strain jobs, the odds did not differ significantly from those of nurses (OR=0.85, 95% CI 0.58–1.25).

Table 3-5 – Association between latent job profiles, occupation, and care left undone

	Care left undone[1]							
Independent variables	**Clinical activities (F1)**				**Planning and communication (F2)**			
Job profile	**Est.**	**SE**	**p-value**	**ES[2]**	**Est.**	**SE**	**p-value**	**ES[2]**
Passive job *(ref)*	/	/	/	/	/	/	/	/
Active job vs passive job	0.0448	0.0103	<0.0001*	0.184	0.0692	0.0084	<0.0001*	0.245
Low strain job vs passive job	-0.0702	0.0121	<0.0001*	-0.289	-0.0607	0.0099	<0.0001*	-0.362
High strain job vs passive job	0.1612	0.00995	<0.0001*	0.659	0.1547	0.0081	<0.0001*	0.703
Occupation								
Physician vs nurse *(ref)*	-0.0111	0.0077	0.1564	0.04	-0.0071	0.0063	0.2541	0.03

*Indicates statistically significant differences (p<0.05).
(1) Care left undone is modelled using a multilevel linear mixed effects model with REML.
(2) ES=Effect Size.

Table 3-6 – Association between latent job profiles, occupation and burnout and intention to leave

	Burnout[1]				Intention to leave[2]			
Threshold coefficients[3]	**Model 1**		**Model 2**		**Model 1**		**Model 2**	
Categories	**OR**	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**
No burnout vs at risk of burnout	1.68	1.31 – 2.15*	1.83	1.43 – 2.34*				
At risk of burnout vs burned out	3.29	2.57 – 4.22*	3.59	2.79 – 4.60*				
Independent variables								
Passive job *(ref)*	/	/	/	/	/	/	/	/
Active job vs passive job *(ref)*	1.10	0.98 – 1.23	1.24	1.08 – 1.41*	0.52	0.43 – 0.62*	0.63	0.51 – 0.78*
Low-strain job vs passive job *(ref)*	0.47	0.40 – 0.55*	0.53	0.44 – 0.63*	0.21	0.16 – 0.28*	0.25	0.19 – 0.34*
High strain vs passive job *(ref)*	2.39	2.15 – 2.66*	2.59	2.29 – 2.93*	2.21	1.86 – 2.61*	2.30	1.89 – 2.79*
Physicians vs nurses *(ref)*	0.82	0.76 – 0.89*	1.12	0.91 – 1.39	0.63	0.54 – 0.73*	0.97	0.71 – 1.37
Active job by Occupation			0.64	0.50 – 0.83*			0.43	0.28 – 0.66*
Low-strain job by Occupation			0.63	0.42 – 0.94*			0.46	0.23 – 0.91*
High-strain job by Occupation			0.74	0.59 – 0.94*			0.85	0.58 – 1.25

*Indicates statistically significant differences ($p<0.05$).

(1) Burnout is modelled as an ordinal outcome using a cumulative link mixed model (CLMM) with a probit link function.

(2) Intention to leave is modelled as dichotomous outcome (nominal) using a generalised linear mixed model with a logit link function.

(3) The threshold coefficients only apply to modelling burnout as an ordinal outcome; they do not apply to modelling the intention to leave.

3.4 DISCUSSION

We aimed to identify latent job profiles for nurses and physicians in acute hospitals based on perceptions of job demands and resources. Unlike prior research using variable-centred approaches focused mainly on nurses, we adopted a person-centred approach to explore how distinct profiles relate to outcomes, care left undone, burnout, and intention to leave, for both professions, offering new insights into profession-specific dynamics.

The discussion is organised into two sections. First, we examine individual-level findings from the multilevel Latent Class Analysis (MLCA), identifying job profiles and their associations with burnout, care left undone, and intention to leave, as well as differences between nurses and physicians. Second, we address hospital-level findings, analysing patterns within latent hospital groups and how organisational characteristics (size, teaching status) influence profile distribution and implications for workforce well-being.

MLCA identified four distinct latent job profiles at the individual level: active, low strain, high strain, and passive jobs, aligning closely with the four quadrants proposed by Bakker and Schaufeli in the JD-R model, inspired by Karasek's job types.[42] Most individuals (40% of the sample) matched the high strain profile; consistent with global healthcare trends, where workers face significant pressure due to factors such as an ageing workforce, austerity measures, and increasing patient complexity.[43,44] Another 30% of the sample identified with the active job, where high demands are buffered by job resources.[45] These findings underscore the need to jointly examine job demands and resources, as in the JD-R model. Interestingly, some response probabilities deviated from expectations. Both active and high-strain profiles showed high demands, but red tape was less likely in active jobs, suggesting bureaucracy was less prevalent or better managed. Notably, even profiles with low resources (high-strain, passive) reported high teamwork between nurses and physicians, while these same groups had the lowest likelihood of "management that listens," highlighting the critical role of leadership and management quality.[46]

We find support for hypothesis 2a: individuals in the high-strain profile leave more care undone and have higher odds of burnout and intention to leave, consistent with prior research.[47,48] High-strain jobs were linked to greater burnout, significantly higher turnover intentions, and more care left undone. Conversely, low-strain jobs were associated with favourable outcomes, lower burnout, reduced intention to leave, and less care left undone. Interestingly, active jobs (high demands and resources) showed slightly more care left undone than passive jobs, suggesting workload drives this outcome even when resources are present. These findings align with previous studies on care left undone among physicians and nurses in Europe.[24,49,50]

Hypothesis 2b proposed similar effects for nurses and physicians in the high-strain group, but the findings partially challenge this hypothesis. Overall, physicians reported lower odds of burnout and intention to leave than nurses. Interaction effects showed that physicians had lower odds of burnout across all profiles,

including the high-strain profile. The same pattern held for intention to leave, except in high strain, where odds did not differ significantly. No significant differences were found for care left undone initially, but sensitivity analysis with interaction terms revealed that physicians left significantly less care undone than nurses across all profiles and both factors. These results should be interpreted cautiously, as nurses and physicians were not matched within hospitals but not always within the same care context (patient group, speciality, unit). Nonetheless, findings for hypotheses 2a and 2b underscore the pervasive impact of high-strain jobs, highlighting the need for targeted interventions.

MLCA revealed four latent hospital groups with distinct patterns of job profiles, showing hospital-level characteristics influence how job demands and resources affect nurses and physicians. In high-strain dominant and balanced hospital groups (larger and teaching hospitals), nurses and physicians show similar distributions of high-strain profiles. However, nurses tend toward active profiles, while physicians not in high-strain profiles fall into low-strain or passive categories. This difference may stem from teaching hospital features, where physicians face clinical, academic, and teaching responsibilities,[51] while nurses have more career development opportunities.[52] In the moderate high-strain hospital group, nurses show higher proportions of high-strain profiles than physicians, who tend toward active profiles. This pattern reflects smaller, non-teaching "physician-centred" hospitals, where physicians have more autonomy and leadership roles, while nurses have fewer resources and advancement opportunities. The active dominant hospital group shows predominantly active profiles for both professions, suggesting organizations can balance job demands and resources effectively. However, the variance in outcomes attributable to hospital groups is relatively small, possibly because participating hospitals were more homogeneous. The Magnet4Europe study's voluntary participation by hospitals committed to improving work environments may have introduced selection bias. The higher variance explained at individual versus organizational level aligns with literature showing work outcomes are primarily influenced by individual characteristics rather than organizational effects.[53–55] However, omitted variable bias may mean important organizational traits were overlooked. A sensitivity analysis using actual hospital identifiers produced identical results, reinforcing the limited influence of latent hospital groups on fixed effects and interactions.

3.4.1 Limitations

Several limitations should be noted. First, the cross-sectional design limits causal inference; future longitudinal studies could examine how changes in job demands and resources, e.g., through Magnet4Europe, affect latent job profiles over time. Second, while MLCA effectively identified profiles and hospital groupings, unmeasured confounders at both levels (e.g., leadership style, patient acuity) may influence results. Third, the analysis was constrained by the availability of comparable items for nurses and physicians, preventing the inclusion of factors such as staffing policies or workload distribution. Some measures relied on single items rather than validated scales, and case-mix differences were not fully

captured. Finally, care left undone items differed between professions in number and wording, limiting direct comparability.

3.4.2 Implications for Policy and Future Research

Our findings highlight the urgency of addressing high-strain work environments, which increase burnout, care left undone, and turnover intentions. Policymakers should promote adequate staffing, reduce bureaucracy, and enhance professional autonomy. Investment in leadership training can foster supportive management, mitigating burnout and attrition. Larger teaching hospitals should implement targeted strategies such as workload management and autonomy enhancement. Traditionally, organisational interventions like the Magnet Recognition Program have focused on nurses, improving satisfaction and patient outcomes, demonstrating the modifiable nature of job demands and resources. However, physicians face similar stressors, underscoring the need for inclusive organisational redesign to support all healthcare professionals.

3.5 CONCLUSION

This study offers insights into how job demands and resources affect nurses and physicians in acute hospitals. Four individual-level profiles—active, low strain, high strain, and passive—and four hospital-level groups were identified. High-strain jobs were most common (40%) and linked to greater burnout, more care left undone, and higher intention to leave. Low-strain jobs showed the most favourable outcomes, while active jobs, despite high resources, still reflected challenges of heavy demands.

Hospital-level analysis showed staff in larger and teaching hospitals were more likely to hold high-strain jobs, reflecting organisational complexity. Nurses were more often in high-strain roles, especially in smaller, non-teaching hospitals, while physicians tended toward active or low-strain profiles.

These findings underscore the impact of high-strain environments and organisational factors on workforce well-being. Because these elements are modifiable, interventions to reduce strain, balance resources, and address hospital-level drivers are essential for improving staff well-being and care quality. Future research should explore longitudinal changes and the effects of organisational redesign on job profiles and outcomes.

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Supplemental Material

Supplemental Material 3-1: Comparison between items included in the instrument to measure nursing care left undone and physician care left undone

Supplemental Material 3-2: Logistic model for higher-level class membership

Supplemental Material 3-3: Logistic model for lower-level class membership

Supplementary Table 3-1 – Comparison of items included in the instrument to nursing care left undone and physician care left undone

Items care left undone nurses	**Items care left undone physicians**
Adequate patient surveillance	Provide a timely response to concerns raised by nurses
Develop or update patient plan of care/care pathways	Develop or update patient plan of care/care pathways
Oral hygiene	Diagnose, treat, or provide continuous care to hospital inpatients
Skin care	/
Comfort/talk with patients	Comfort/talk with patients
Pain management	Pain management
Adequately document nursing care	Adequate documentation of care
Educating patients and family	/
Administer medications on time	Review, update and prescribe medications
Coordinate patient care	Coordinate patient care
Educating colleagues and students	Educate colleagues and students
Coordinate patient discharge planning	Coordinate patient discharge planning
Ward rounds with doctors and other team members	Ward rounds with nurses and other team members

Supplementary Table 3-2 – Logistic model for higher-level class membership

	Alpha	S.E.	Z-score	p-value
MODEL FOR G2 (BASE G1)				
Intercept	0.004	0.2497	0.0161	0.9872
Hospital size	0.5162	0.4524	1.1411	0.2538
Teaching status	1.1539	0.4617	2.4994	0.0124
Germany	-3.0566	31.859	-0.0959	0.9236
Ireland	-2.9905	255.7392	-0.0117	0.9907
Scandinavia	-0.3903	0.079	-4.9389	<0.0001
England	-3.8194	3.5857	-1.0652	0.2868
MODEL FOR G3 (BASE G1)				
Intercept	-3.3041	0.1281	-25.8014	<0.0001
Hospital size	1.1571	0.4626	2.5012	0.0124
Teaching status	-3.4571	0.2358	-14.6628	<0.0001
Germany	5.1723	31.8608	0.1623	0.871
Ireland	4.9298	54.889	0.0898	0.9284
Scandinavia	-5.1059	0.2059	-24.803	<0.0001
England	-6.2502	4.1443	-1.5081	0.1315
MODEL FOR G4 (BASE G1)				
Intercept	-4.8845	0.4203	-11.6217	<0.0001
Hospital size	0.7539	0.2574	2.9285	0.0034
Teaching status	0.8307	0.0928	8.9476	<0.0001
Germany	3.5583	31.8649	0.1117	0.9111
Ireland	3.0173	3.6122	0.8353	0.4035
Scandinavia	-0.2446	3.5835	-0.0683	0.9456
England	1.6827	3.6089	0.4663	0.641

Supplementary Table 3.3 – Logistic model for lower-level class membership

	Gamma	S.E.	Z-score	p-value
MODEL FOR C2 (BASE C1) GIVEN G1				
Intercept|C2,G1	-0.58	0.0997	-5.8159	0.0000
Occupation |C2,G1	-0.4508	0.1712	-2.6341	0.0084
MODEL FOR C3 (BASE C1)				
Intercept|C3,G1	-0.6199	0.1973	-3.1415	0.0017
Occupation |C3,G1	0.2392	0.1394	1.716	0.0862
MODEL FOR C4 (BASE C1)				
Intercept|C4,G1	-1.4322	0.0992	-14.4439	0.0000
Occupation |C4,G1	0.1498	0.2387	0.6277	0.5302
MODEL FOR C2 (BASE C1) GIVEN G2				
Intercept|C2,G2	-0.1634	0.1483	-1.1012	0.2708
Occupation |C2,G2	-0.5149	0.1951	-2.6386	0.0083
MODEL FOR C3 (BASE C1)				
Intercept|C3,G2	1.0205	0.228	4.4767	0.0000
Occupation |C3,G2	-1.2647	0.1313	-9.63	0.0000
MODEL FOR C4 (BASE C1)				
Intercept|C4,G2	0.5581	0.123	4.5385	0.0000
Occupation | C4,G2	-1.3388	0.2213	-6.0508	0.0000
MODEL FOR C2 (BASE C1) GIVEN G3				
Intercept|C2,G3	-1.4858	0.2331	-6.3742	0.0000
Occupation |C2,G3	0.4164	0.2505	1.6619	0.0965
MODEL FOR C3 (BASE C1)				
Intercept|C3,G3	0.8327	0.427	1.9502	0.0511
Occupation |C3,G3	0.4173	0.1693	2.4655	0.0137
MODEL FOR C4 (BASE C1)				
Intercept|C4,G3	-0.5684	0.1189	-4.7816	0.0000
Occupation |C4,G3	0.6694	0.312	2.1454	0.0319
MODEL FOR C2 (BASE C1) GIVEN G4				
Intercept|C2,G4	-1.1395	0.1352	-8.4301	0.0000
Occupation |C2,G4	-0.034	0.1828	-0.1861	0.8524
MODEL FOR C3 (BASE C1)				
Intercept|C3,G4	-0.0246	0.2731	-0.0903	0.9281
Occupation | C3,G4	0.347	0.1479	2.3461	0.0190
MODEL FOR C4 (BASE C1)				
Intercept|C4,G4	-1.2223	0.097	-12.5952	0.0000
Occupation |C4,G4	0.1458	0.3026	0.4819	0.6299

CHAPTER 4

UNRAVELLING THE CONCEPTUALISATION OF UNFINISHED CARE AMONG PHYSICIANS IN ACUTE CARE HOSPITALS: A SCOPING REVIEW

This chapter is published as:

Dello, S., De Smet, K., Sermeus, W. (2025). Unravelling The Conceptualisation Of Unfinished Care Among Physicians In Acute Care Hospitals: A Scoping Review. *BMJ Open*

ABSTRACT

Background

Unfinished care - also referred to as care left undone, missed care, or implicit rationing - has been widely studied in nursing but remains poorly defined and underexplored in the medical profession. Physicians play a central role in diagnosis, treatment, and coordination of care, yet little is known about the extent, determinants, and consequences of unfinished care in their daily work.

Objective

To systematically map and synthesise existing evidence on how unfinished care among physicians in acute care hospitals has been conceptualised, measured, and empirically studied.

Eligibility criteria

Original, peer-reviewed studies on physicians working in acute care hospital settings that explicitly addressed unfinished care, care left-undone, missed care, suboptimal care or closely related constructs at the micro level of clinical work. Exclusions: primary care, allied professions, adherence to guidelines, underuse at the population level, explicit macro-level rationing, non-original reports, non-English, no full text available.

Sources of evidence

Five bibliographical databases PubMed, EMBASE, Web of Science, SCOPUS, and CINAHL were searched in June 2024 to identify relevant studies.

Charting methods

Two reviewers independently screened titles/abstracts and full texts against pre-specified criteria defined following the population, concept, context (PCC) framework, with consensus resolution. Data were charted on study characteristics, terminology/definitions, measurement approach, and findings. Methodological quality was appraised by the authors and an external independent expert using the Mixed Methods Appraisal Tool (MMAT). Qualitative and quantitative findings were charted, then synthesized via a descriptive and thematic analysis.

Results

Using predefined inclusion and exclusion criteria, 1,971 potentially relevant titles and abstracts were identified and subsequently screened. Eight studies met the inclusion criteria, comprising three quantitative, three qualitative, one mixed methods and one quantitative non-randomized study. Only one study explicitly defined and measured “care left undone,” reporting that 78.3% of surveyed physicians had omitted at least one necessary care activity during their most recent shift. The terminology and clarity of concepts varied significantly across the studies (e.g., “shortcuts”, “missed opportunities”, “suboptimal care”). Identified

drivers emerged at both organizational (e.g., high workload, poor communication) and individual (e.g., burnout, fatigue) levels. While two studies connected care left undone to adverse patient outcomes (e.g., readmissions) and worse physician well-being, the overall evidence on its prevalence and consequences remains limited. Overall methodological quality of the included studies was moderate, but conceptual and theoretical development remained limited.

Conclusion

This scoping review reveals major conceptual and empirical gaps in the study of unfinished care among physicians. Terminology is inconsistent, theoretical grounding is weak, and validated measurement tools are lacking. Evidence on prevalence, determinants, and consequences remains scarce and largely descriptive. To advance the field, future research must establish conceptual clarity, achieve terminological consensus, and develop robust, validated instruments to capture how unfinished care manifests within complex clinical systems.

STRENGHTS AND LIMITATIONS

- This scoping review follows Arksey and O'Malley's framework, ensuring a systematic and transparent approach.
- Study selection followed the PCC framework, with predefined criteria. Quality was appraised using the MMAT tool.
- Most studies were methodologically sound, but the overall evidence was weak as none established causality, and several relied on unvalidated tools or anecdotal data.
- The search included various synonyms for unfinished care, but studies using alternative theoretical frameworks may have been overlooked, introducing selection bias.
- Only English-language publications were included, and grey literature was not explored, potentially omitting relevant studies and inducing selection bias.

4.1 INTRODUCTION

Unfinished care - often referred to as care left undone, missed care, or implicit rationing - has been a major focus of nursing research over the past two decades, giving rise to multiple terminologies shaped by cultural and conceptual contexts.[1–4] Terms such as missed care, implicit rationing, unfinished care, care left undone and unmet needs are often employed interchangeably.[5–7] Recognizing these subtle distinctions, the concept fundamentally refers to necessary care that is either partly or fully omitted or significantly delayed. Thus, in this article, we will refer to the umbrella term “unfinished care” to broadly include the similar concepts and terms in the literature.[3]

The prevalence of care left undone among nurses is high [3,7] and is associated with adverse outcomes for patients such as prolonged hospital stays, increased hospital readmissions, and diminished patient satisfaction.[3,8–11] Nurses also experience adverse effects such as reduced job satisfaction, higher turnover rates, increased moral distress, role conflicts and burnout.[8,12,13] Despite the variations in their conceptual frameworks, these studies consistently highlight that the delivery of nursing care is central to their findings. In these models, the surveillance role of nurses, who interact closely and continuously with patients, is paramount. One of the most widely referenced and empirically tested frameworks is that proposed by Aiken et al. [14], which hypothesizes that inadequate staffing levels and poor practice environments are linked to a higher degree of unfinished care.[15] Additionally, unfinished care has been identified as a critical mediating variable between nursing staffing and patient outcomes, accounting for a substantial portion of the observed effects.[16]

The relationship between nurse staffing, the failure to detect early signs of patient deterioration, and the increased risk of adverse events has shifted much of the research and policy focus towards nurses. However, it is essential to recognize that the healthcare workforce is highly interdisciplinary; all team members must collaborate effectively to respond to or prevent patient deterioration.[17] In-hospital patient care involves a multidisciplinary staff; no single discipline is solely responsible for patient outcomes. Teamwork between nurses and physicians is a crucial aspect of the working environment for delivering high-quality and safe patient care.[18,19] Additionally, staffing levels of other healthcare professionals and the composition of the teams also affect the quality, safety and outcomes of patient care.[17,20,21] Despite this interdependence, the concept of unfinished care has rarely been examined from the physician perspective. Physicians occupy a pivotal position in care coordination, clinical decision-making, and prioritisation of diagnostic and therapeutic interventions - activities that directly shape both nursing workflows and patient outcomes. Yet, physicians face distinct pressures, including cognitive workload, competing clinical and administrative tasks, and professional norms of autonomy, which differ markedly from the conditions studied in nursing research. Understanding unfinished care through the physician lens is therefore essential to capture the full complexity

of care delivery in hospital settings. Such an expansion acknowledges that care left undone is not only a nursing issue but a systemic phenomenon that traverses professional boundaries.

There is substantial evidence linking low medical staffing levels with an increased risk of patient mortality.[22–26] However, these associations are typically interpreted as quantitative indicators of workforce adequacy rather than as reflections of what physicians actually leave undone in their day-to-day clinical practice. Exploring unfinished care among physicians thus enables a more granular understanding of how workload and resource constraints translate into omitted, delayed, or reprioritised medical tasks. In studies that consider multiple staff groups simultaneously, some findings indicate a reduction or even a complete absence of the effects observed in models focusing on a single staff group, particularly after adjusting for the involvement of other qualified professionals.[17] These cross-disciplinary findings reinforce the need to extend unfinished care research to physicians, enabling more integrated models of team-based care quality and safety.

While the concept of unfinished care is closely related to other constructs like underuse and healthcare rationing, it is essential to distinguish between these terms to avoid confusion. Underuse typically refers to systemic or population-level gaps in adherence to existing guidelines.[27] The reasons for underuse are generally classified into several categories: inadequate access to health care, lack of availability within specific health systems (e.g., system failures and human resource shortages), poor provider adherence of evidence-based practice (e.g., inappropriate prescribing or lack of adoption), and patient preference or non-compliance. A related concept is healthcare rationing, which encompasses the withholding or delaying certain treatments or interventions due to resource limitations. This means that legitimate medical needs may not be met. Rationing is often a conscious, calculated, and explicit decision, though not always transparent, made in prioritizing care when resources are scarce, rather than simply failing to provide care due to external pressures. While healthcare rationing can directly impact patient care and lead to care not being performed, it is distinct from the concept of unfinished as explored in this study. Although these macro-level perspectives are relevant – especially in today's healthcare environment characterised by financial and human resources constraints –they fall outside the scope of this scoping review. Instead, this review will focus on the micro-level elements, such as physician characteristics, fundamentals of care, and the work environment.

Despite the relevance of this issue, the conceptual, theoretical, and empirical bases of unfinished care among physicians remain poorly defined. Consequently, there is limited understanding of how unfinished care manifests in physicians' daily work, what factors drive it, and what implications it has for patient outcomes or physician well-being. Given the conceptual heterogeneity and limited theoretical development of this topic, a scoping review was deemed the most appropriate methodological approach. Scoping reviews are particularly suited for mapping broad and emerging fields of research clarifying conceptual boundaries and

identifying knowledge gaps - especially when the evidence base is too diverse or conceptually diffuse to permit a systematic review.[28,29] Scoping reviews differ from systematic reviews in both purpose and process: rather than assessing the methodological quality of studies or synthesizing effect sizes, they aim to map the extent and characteristics of the existing literature, clarify key concepts, and identify gaps that warrant more focused investigation.[30]

Accordingly, the aim of this scoping review is to systematically chart and synthesise existing evidence on unfinished care among physicians working in acute care hospitals. Specifically, this review seeks to (1) examine how the concept of unfinished care among physicians has been defined and conceptualised, and (2) identify what is known about its prevalence, antecedents, and consequences for both physicians and patients. By consolidating this fragmented literature, the review aims to provide a comprehensive overview of the field and to establish a conceptual and empirical foundation for future research and policy efforts to improve quality and safety in medical practice.

4.2 METHODS

4.2.1 Design

A scoping review was conducted to explore the concept of care left undone among physicians. This review adhered to the stages outlined by Arksey and O'Malley, which include identifying the research question, finding relevant studies, study selection, charting the data and summarizing and reporting the findings.[31] This scoping review is reported by the Preferred Reporting Items Systematic Reviews and Meta-Analyses extension for scoping review guidance (PRISMA-ScR).[32] A protocol for the review was registered with the Open Science Framework.

4.2.1.1 Stage one: Identifying the research question

This scoping review aimed to summarise and synthesise existing theories, concepts, and empirical evidence on unfinished care among physicians working in acute care hospitals. Guided by this overarching purpose, the review addressed two focused research questions designed to provide both conceptual and empirical clarity. First we aim to explore how the concept of unfinished care among physicians has been defined, characterised, and operationalised within the existing literature. Within this aim we focus on identifying the conceptual or theoretical frameworks underpinning these studies. In addition we aim to explore how the concept unfinished care has been measured, including whether structured or validated instruments have been employed. Secondly, we aim to explore what is currently known about the prevalence, contributing factors and implications of unfinished care among physicians. Both questions guide the mapping and synthesis process, allowing to identify how unfinished care among physicians has been conceptualised and

studied, to evaluate consistency in terminology and measurement, and to highlight remaining conceptual and empirical gaps that warrant future investigation.

4.2.1.2 Stage two: Finding relevant studies

Researchers KDS and SD drafted the initial search strategy, which was structured around two main themes. The first pillar was “unfinished care”, the second “physicians”, corresponding to the concept and the target population of interest. A pilot database search was conducted. The final search strategy was refined with the assistance of an experienced librarian. Bibliographic databases, including PubMed (including MEDLINE), EMBASE, Web of Science (WOS), SCOPUS, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL), were searched. The search was conducted in June 2024 by KDS and SD. A detailed search strategy for both PubMed and EMBASE is provided in Supplemental Material 1. Relevant index terms were adjusted appropriately to facilitate searches across the various databases. No filters were applied during the search process to ensure that potentially relevant studies were not excluded a-priori. The search across the aforementioned bibliographic databases yielded 4.068 results.

4.2.1.3 Stage three: Study selection

A systematic and iterative approach was employed to identify the relevant studies. The search results from the five databases were imported into screening software (Rayyan) and merged. The merged database revealed 2.097 duplicates, which were removed, resulting in 1.971 studies available for blind peer-reviewed screening. KDS and SD meticulously reviewed all titles and abstracts adhering to the pre-defined in- and exclusion criteria (see Table 4-1). Studies had to be peer-reviewed and present original research to qualify for inclusion. Reviews and conference abstracts were excluded, although the reference list of identified reviews through the search was examined for any pertinent studies that could be included in the scoping review. For those studies where the full text was not accessible after an initial search, the corresponding authors were contacted. If the full text remained unavailable, these studies were also excluded. During the screening process, an additional 23 studies were identified for further screening. In the subsequent phase, disagreements regarding study selection, exclusion, and data extraction were resolved through consensus and discussion between both reviewers. The process for study selection is shown in the PRISMA flow diagram (see Figure 4-1).

To enhance methodological rigour and transparency, all included studies underwent a structured quality appraisal conducted by multiple reviewers. The appraisal process was designed to ensure both consistency and independence in evaluating methodological quality across diverse study designs. The Mixed Method Appraisal Tool (MMAT) was chosen to appraise the methodological quality of the eight studies included in this review. The MMAT appraisal involves selecting and assessing five quality criteria, tailored to the specific study design, whether qualitative, quantitative, or mixed methods. This approach provides an overall quality

score and an evaluation of each quality item, enabling a thorough and transparent appraisal of every study. The aggregated MMAT quality assessment categorizes the included studies as moderate, with a median score of 3.

Table 4-1 - Eligibility criteria for the Scoping Review

	Inclusion criteria	**Exclusion criteria**
Population	Physicians active in acute care hospitals	Primary care physicians Nurses Allied health professionals No explicit mentioning of the population
Concept	Care left undone: i.e. any care that should have been delivered by a medical doctor but was not delivered in full or not timely.	No explicit mentioning of care left undone, or any concept related to it. Adherence to guidelines, healthcare rationing
Context	Acute care hospital setting	Primary care setting

To ensure the reliability and independence of the appraisal process, the quality assessment was performed collaboratively by two reviewers (KDS and SD). In addition, an external reviewer with relevant academic expertise in research methodology and healthcare quality, independently appraised all included studies, as one of the included studies is also authored by the first author of this paper. This triangulated approach, involving a qualified independent reviewer, strengthened the objectivity and robustness of the quality assessment.

4.2.1.4 Stage four: charting the data

Data charting forms were collaboratively designed by KDS and SD. The items extracted from the studies for data charting included study design, country, population, sample size, aetiology and description of concepts.

4.2.1.5 Stage five: Collating, summarizing and reporting of the results

During the fifth stage, an analysis of the included studies was performed. This involved providing a descriptive numerical summary of the studies as well as a reflexive thematic analysis that concentrated on terminology, conceptualization, prevalence and aetiology of unfinished care among physicians.

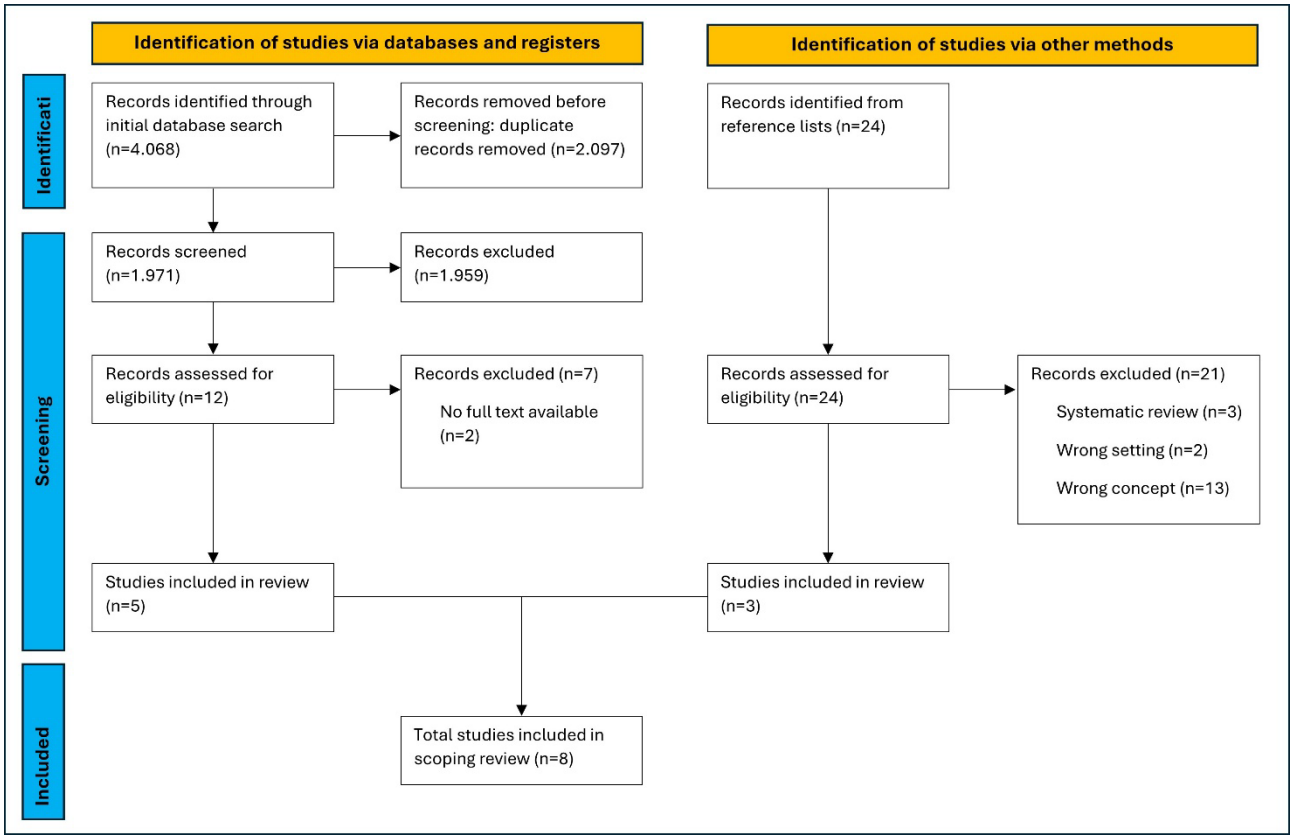

Figure 4-1 - Modified PRISMA 2020 flow diagram showing the selection of studies

4.2.2 Patient and public involvement

Patients and members of the public were not involved in the design, conduct, reporting, or dissemination plans of this scoping review.

4.3 RESULTS

4.3.1 Description of the included studies

A total of eight studies were identified and included in this scoping review (see Table 4-2). The methodological quality of the included studies varied, with MMAT scores ranging from 2 to 5 (see Table 4-2). Three studies demonstrated moderate to high methodological quality (four or more stars), whereas five were rated lower due to limited methodological detail, unvalidated instruments, or small and non-representative sample sizes. In interpreting the results, greater weight was given to findings derived from studies with higher MMAT ratings, while insights from lower-quality studies were considered exploratory. Individual criterion ratings were reported to allow a nuanced interpretation of methodological strengths and weaknesses. A detailed presentation of the rating of each criterion for each included study is provided in Supplemental Material 2. Five studies were conducted in European countries, two in the United States and one in Australia. Notably, no studies from Africa, the Middle East, or Asia were found. Additionally, one study was identified as a multicentre study (see Table 4-2).

4.3.2 Conceptualisation and measurement

The comprehensiveness and level of detail in describing the concept of unfinished care varies across the included studies. Three categories of conceptualisation were derived based on (1) conceptual clarity and (2) the use or description of a measurement instrument. The first level of conceptualisation (level 1 – high conceptual development) is categorised by a clear definition and conceptual clarity and a detailed description of the measurement instrument used. The second level of conceptualisation (level 2 – moderate conceptual development) is characterised by having a reasonable definition of the concept, but it lacks depth and clarity. The measurement instrument used is not robust and does not fully capture the concept. The third level of conceptualisation (level 3 – low conceptual development) is characterised by vague or absent definitions. Any measurement instruments are not validated, or the study relies on qualitative reports or unstructured interviews without quantifiable instruments.

Among the eight studies in the scoping review, one study distinguished itself as a Level 1 study by clearly defining "care left undone"; the methodological quality was moderate. In the study of Dello et al., “care left undone” is defined as leaving one or more of eleven predetermined care activities undone by physicians during their most recent shift. These activities pertain to direct patient care management, patient interaction, collaboration, communication, and documentation of care. The instrument used to measure the concept was well described and based on a validated tool, although it was initially developed for nursing care rather than for physicians. Two measures of care left undone were derived: a composite sum score and a dichotomous measure indicating whether at least one of the eleven care activities was left undone or if no care was left undone.[33]

Two studies were categorised as a level 2. The first, by Feigenbaum et al., identified factors contributing to potentially preventable readmissions, categorised into three main categories, i.e. care during index stay, the discharge process, and follow-up care. Examples from each category include *“suboptimal coordination of care”*, *“transition care plan absent or inadequate,”* and *“missed referrals”*, reflecting a mixture of administrative activities and communication. While no specific instrument was used, the chart review method clearly described which care activities were left undone/unfinished and their frequency.[34] The second Level 2 study, conducted by Shanafelt et al., utilized a self-developed instrument to measure self-reported patient care practices (five items) and attitudes or behaviours that physicians exhibited (three items) during patient interactions or care provision. These statements were based on hypothesized effects of burnout on patient care. The five self-reported items related to suboptimal care are related to direct patient care, such as the statement: *“I found myself discharging patients to make the service ‘manageable’ because the team was so busy”.*[35]

The other five studies were categorized as level 3. For example, Ibrahim et al. described unfinished care as routine work left undone, mainly focusing on administrative tasks related to prescribing and rewriting drug charts. In the included study, the term "drug chart" referred to the patient's medication administration or prescription record, used to document ongoing medication orders and adjustments within the hospital. They noted *"work that should have been completed within normal working hours. These actions included such tasks as re-writing expired drug cards and prescribing IV fluids, warfarin and laxatives."*[36]. In two other studies, it was impossible to discern from the authors' descriptions the specific elements of care being referred to, such as whether they were administrative, direct patient care, or communication. One study used the term "lowered patient care," defined as "*taking shortcuts, not following procedures"*. Another study asked physicians: "Do you think your hours of duty are so long as to impair your ability with adequate efficiency?".[37,38]

In the remaining qualitative studies, the concept of unfinished care predominantly referred to tasks related to medication prescribing and chart updates, as illustrated by the following quotes:

"We had a septic patient in the department... They definitely could have declined if we weren't on top of it... We had to encourage doctors to write up the next bag of fluids and remind them that things were due, and things needed to be written up while they were busy."[39]

"As identified by both nurses and doctors, left-over tasks from ward rounds included the rewriting of drug charts by on-call medics for unfamiliar patients, prescribing analgesia, sliding scales of insulin, warfarin, night sedation and fluids. The prescribing of pre-operative insulin regimes and patient discharge notes were also regularly allowed to roll into the out-of-hours *period."*[40]

4.3.3 Prevalence

One multicentric study used a structured measurement instrument to estimate the prevalence of unfinished care in a European context (see Table 4-2). The results indicated that unfinished care was highly prevalent among physicians. On average, physicians reported leaving 3.1 (SD = 1.0) activities undone during their most recently worked shift. Notably, 78.3 % of physicians left one or more activities undone. Similar patterns were observed across different countries. The items most frequently left undone were related to psychosocial care and documentation of care. At the same time, activities focused on providing direct care and addressing the physical needs of patients were less often neglected.[33]

4.3.4 Aetiology care left undone

The thematic analysis of the included studies revealed that the drivers of unfinished care can be categorized at both the organisational and individual levels. The strongest evidence for organisational antecedents stems from a high quality study (see Table 4-2), demonstrating that high physician workload – an organisational variable - was significantly associated with an increased likelihood of leaving care undone.[33]. Additional

organisational factors - such as communication problems, limited managerial support, and operational inefficiencies - were also identified.[40] Brady et al. (2017) provided well-developed and contextually grounded insights into how communication and teamwork shape task completion. [38] Findings from lower-quality studies, such as Ibrahim (2013) and Firth-Cozens (1997), were more descriptive and based on limited methodological detail or unvalidated measures.[36,37] Taken together, the evidence suggests that both structural and cultural features of the work environment contribute to unfinished care among physicians, though the robustness of findings varies in line with study quality.

At the individual level, contributors to unfinished care included poor mental health, fatigue, inadequate training, and limited experience. Research by Shanafelt et al. (2002) (moderate quality, see Table 4-2) demonstrated that residents experiencing burnout were significantly more likely to self-report at least one type of suboptimal patient care each month than their non-burned out counterparts.[41]

4.3.5 Impact of unfinished care

Two studies evaluated the impact of unfinished care; both were found to be of high methodological quality (see Table 4-2). One study found that when physicians leave care undone, they face increased odds of emotional exhaustion, job dissatisfaction, poor quality of care, and low patient safety ratings.[33] The study by Feigenbaum et al. reported that when care was left undone during a patient's initial stay, discharge process or follow-up, the risk of all-cause 30-day readmission increased, indicating a negative impact on patient outcomes.[34]

4.3.6 Literature gaps

Taken together, the included studies present a heterogeneous but informative picture of unfinished care among physicians. To synthesise these findings across conceptual, methodological, and thematic dimensions, an evidence heatmap was developed (see Figure 4-2). This visual summary integrates the focus and quality of each study, illustrating where the evidence base is strongest and where important knowledge gaps remain. Most studies addressed antecedents or drivers of unfinished care - such as workload, fatigue, and communication issues - though this evidence was mixed in quality, ranging from exploratory[36,37] to high methodological rigour.[39,40] Evidence on conceptualisation and measurement remains sparse, with only Dello et al. (2023) providing a clearly defined and empirically measured framework.[33] Research exploring outcomes or impacts is limited but of relatively high quality, notably linking unfinished care to physician well-being (Shanafelt et al. 2002) and patient outcomes such as readmissions.[34,41] Overall, the heatmap illustrates an uneven evidence base -dense in descriptive studies on antecedents but thin in theoretically grounded and measurement-focused work - highlighting the need for conceptual refinement and higher-quality empirical designs.

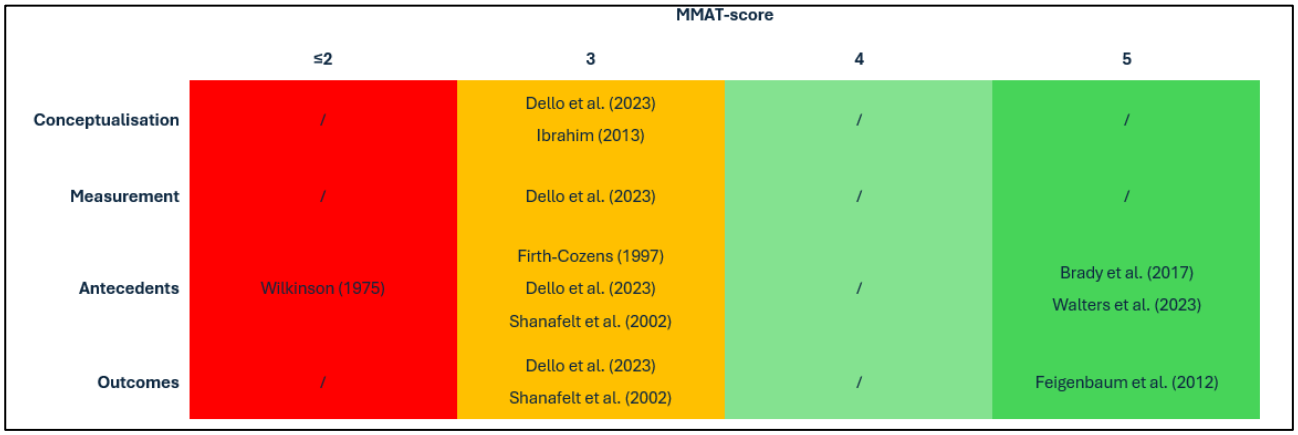

Figure 4-2 - Evidence heatmap of included studies by theme and methodological quality (MMAT rating)
Note: Each cell lists studies addressing a given theme within the MMAT quality category.

Table 4-2 - Included studies scoping review

Author/year	Country	Study design	Population	Sample	Terminology	Critical appraisal
Brady et al. 2017 [40]	Ireland	Qualitative, Focus groups & individual interviews Monocentric	Junior, non-consultant doctors Other healthcare workers	27	Leftover tasks	*****
Dello et al. 2023 [33]	Belgium, England, Germany, Ireland, Norway and Sweden	Quantitative, Cross-sectional, Multicentre	Hospital doctors	2184	Care left undone	***
Feigenbaum et al. 2012 [34]	United States	Mixed methods, Qualitative Individual interviews	Hospital doctors Other healthcare workers	538	Missed opportunities	*****
Firth-Cozens 1997 [37]	United Kingdom	Qualitative	Residents	225	Shortcuts (Lowered standard of care)	***
Ibrahim 2013 [36]	United Kingdom	Quality improvement project	Hospital wards	2	Routine work Left undone	***
Shanafelt et al. 2002 [41]	United States	Quantitative, Cross-sectional,	Residents	115	Suboptimal patient care	***
Walters et al. 2023 [39]	Australia	Qualitative, Semi-structured interviews, monocentre	Hospital doctors Other healthcare workers	4	Missed care	*****
Wilkinson 1975 [38]	United Kingdom	Cross-sectional, Self-administered survey, countrywide	House officers	2452	Short cuts	**

4.4 DISCUSSION

4.4.1 Overview and main findings

Guided by two focused research questions, the review examined (1) how the concept has been defined, characterised, and operationalised in the literature, and (2) what empirical evidence exists regarding its prevalence, antecedents, and outcomes for physicians, patients, and healthcare systems. The conceptual understanding of care left undone varies significantly across the included studies, as do the tools used to measure the concept. Various terms were identified to describe unfinished care (e.g. care left undone, shortcuts, missed opportunities, suboptimal care). This variability is by no means surprising. In the nursing research literature on the topic of unfinished care, over seven different terms are used to describe a similar concept, each with its own definition and empirical basis. Despite the extensive research field of study, researchers have no consensus on which term should be used. Unfinished care remains an emotionally charged issue, influenced by temporal trends and specific contexts.[5]

Only one study explicitly attempted to investigated the prevalence of unfinished care among physicians.[33] This study found that care left undone was highly prevalent and similar patterns were observed across different countries. Items related to psychosocial care were most frequently left undone, while tasks directly related to patient care and addressing the physical needs of patients were left undone less often. These patterns align closely with findings in similar nursing studies.[7,42] A potential explanation for this observation is that the measurement timeframe used in this study (i.e., most recent shift) does not accurately reflect how physicians perform their jobs. While specific tasks, such as administration, might not have been completed during the most recent shift, it does not mean those tasks or actions were not performed at all. Physicians can plan and batch administrative work at different times to - in turn - make patient interactions or other clinical activities more efficient. Additionally, like nurses, physicians have the freedom to prioritize their tasks autonomously, although the timeframe for physicians extends substantially more in time compared to nurses. Clinically active physicians may end up doing "work-after-work" (WOW), even using weekends and holidays to finish administrative tasks.[43,44]

4.4.2 Drivers and implications

The causes of unfinished care among physicians were categorised into system-level and individual-level factors. Physician workload and aspects of the work environment, such as communication, were associated with care not being performed or being delayed. Evidence from nursing research studies reveals similar findings. Factors associated with missed nursing care include staffing levels, skill mix, patient acuity, and teamwork/communication.[2,3] The implications of unfinished care observed in the included studies also resonate with findings from the nursing context. Consequences include overall poor quality of care; adverse events (such as medication errors, falls, nosocomial infections, pressure ulcers, and critical incidents);

increased mortality; and decreased patient satisfaction.[3,15] Additionally, the negative effect on nurse outcomes consistently leads to increased job dissatisfaction, higher intent to leave the profession, and absenteeism. However, as Figure 4-2(heatmap) illustrates, the strength of this evidence varies substantially by theme and study quality. This uneven distribution, confirmed by the MMAT appraisal (Supplemental Material 2), highlights a field still dominated by descriptive rather than strong theory-driven research.

4.4.3 Conceptual and theoretical considerations

The variability in terminology related to care omissions highlights a persistent challenge in the field of unfinished care or care left undone. The RANCARE consortium has emphasized that different healthcare professions, systems, and cultural contexts use varied terminologies to describe similar phenomena, leading to conceptual fragmentation and limited cross-disciplinary comparability.[5] The lack of consensus on terminology is particularly problematic, as it affects the development of unified measurement tools and hinders efforts to establish a common framework for understanding and addressing the issue. For this scoping review, we adopted unfinished care as an overarching term that integrates the various conceptualizations identified in the literature. Unlike missed care, which implies an error of omission, or implicit rationing, which suggests a conscious allocation of limited resources, unfinished care provides a more neutral and comprehensive descriptor. It acknowledges that omissions may result from both unintentional lapses and intentional prioritization due to systemic constraints. This term allows for a more inclusive approach that captures the complexity of care delivery across different professional groups and healthcare settings, reducing ambiguity and facilitating more meaningful comparisons across studies.

Currently, there is no clear and encompassing framework for understanding the concept of unfinished care among physicians. James Reason provides one potential framework for interpreting both individual and system-level failings in healthcare.[45–47] In this framework, active failures (such as slips, lapses, or mistakes) are the immediate triggers of adverse events. In contrast, latent failures represent broader systemic conditions (like insufficient staffing and poor workflow design) that predispose an organization to errors. Unfinished care can be classified as active failure if it stems from a lapse in memory or momentary inattentiveness. At the same time, latent conditions such as excessive workload or lack of resources— central in the Swiss Cheese Model—can create situations in which tasks inevitably go unfinished. This links Reason's system-based theory to omissions of care at the bedside. However, the concept of "unfinished care" is not wholly captured by the notion of human error. Omissions of care can arise from intentional, yet compelled prioritization referred to as "implicit rationing" of care rather than from unintentional lapses or mistakes. In these cases, healthcare professionals must make conscious decisions about which tasks to forego to address higher priority needs due to systemic constraints like inadequate staffing, limited resources, or lack of organizational support. These rationing behaviours do not always fit neatly into Reason's classic taxonomy

of errors, as clinicians frequently perceive them as necessary adaptations to insurmountable demands in an under-resourced environment.

Across the reviewed literature, conceptual heterogeneity stems from differing epistemological assumptions about what constitutes care and who defines it. In nursing, “missed care” and “implicit rationing” emphasize observable task completion and resource constraint, while in physician practice, much of the work is cognitive, relational, or distributed across teams. The concept of unfinished care therefore offers an integrative lens encompassing omission, prioritisation, and deferral within complex systems. Figure 4-3 maps the major terminologies along two intersecting dimensions -intentionality (omission vs. prioritised delay) and locus of causation (individual vs. systemic) - clarifying how diverse conceptualisations relate to physician work. This synthesis advances definitional clarity and provides a foundation for developing measurement tools and theory in future research.

4.4.4 Professional autonomy, moral distress, and the subjectivity of “unfinished” care

While many of the findings regarding unfinished care among physicians align with those observed in nursing, caution should be exercised when extrapolating across these professional contexts. Physicians’ employment arrangements vary widely across countries and healthcare systems. For instance, physicians in private or fee-for-service settings may face implicit financial incentives to complete a higher volume of billable procedures, whereas hospital-employed physicians in public systems often prioritise continuity and comprehensiveness of care within the constraints of fixed hours and institutional accountability. These differing contexts inevitably shape perceptions of what should have been done. A physician in private practice might view not performing a diagnostic test as both a missed clinical opportunity and a financial loss, while a publicly employed physician may interpret the same decision as appropriate prioritisation in a resource-limited environment.

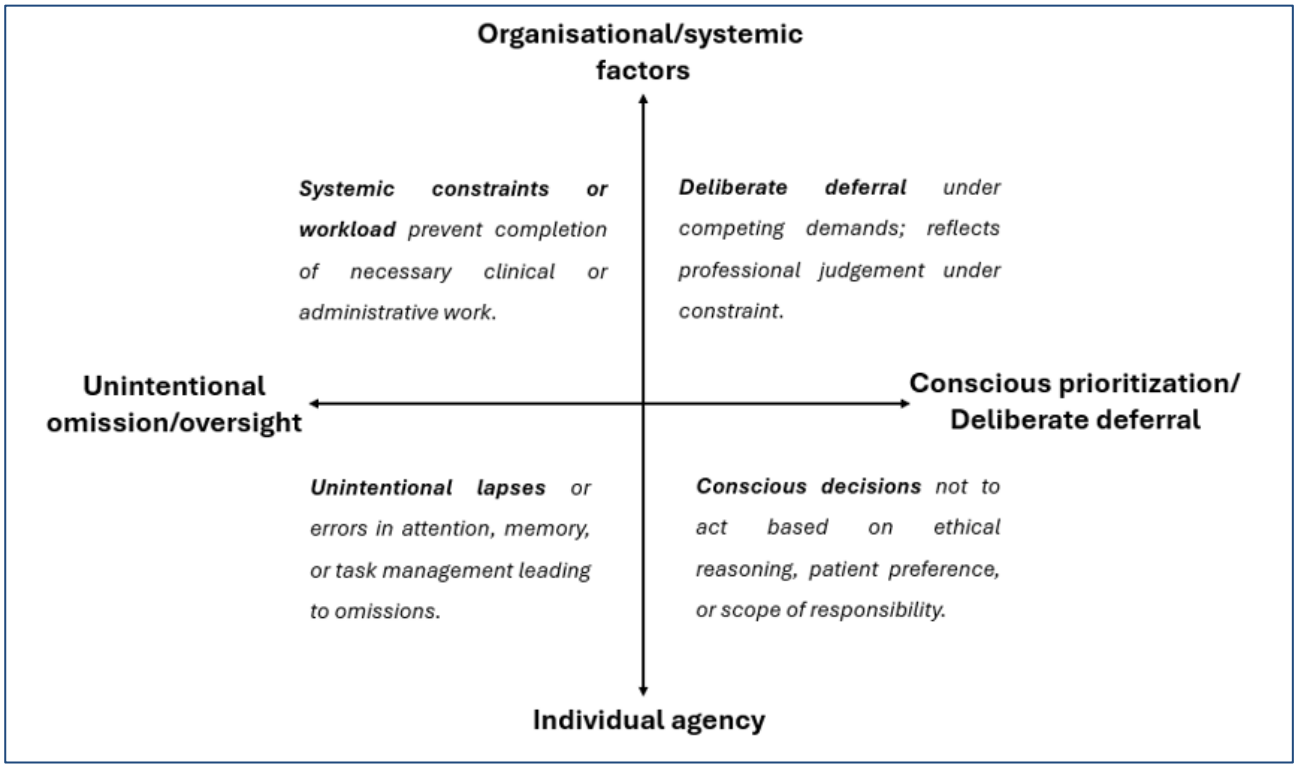

Figure 4-3 – Conceptual matrix of unfinished care

Physicians also typically exercise greater professional autonomy than nurses, allowing them to determine how their time and attention are distributed across competing responsibilities. This autonomy implies that physicians themselves define the boundaries of what should have been done within their professional judgment, moral framework, and perceived duty of care. Consequently, the perception of having left care undone is inherently subjective—it arises when physicians feel that an essential element of care remains incomplete, even if another team member might appropriately perform it or if it has been safely deferred. Such perceived incompleteness can evoke moral distress and a sense of professional inadequacy, underscoring the psychological burden associated with unfinished care.

Furthermore, not all omissions necessarily represent negligence or failure. Some care activities may be intentionally delegated or postponed, reflecting appropriate redistribution or sequencing of work rather than neglect. For example, administrative tasks may be assigned to other team members, or follow-up actions may be planned for completion in the community, provided that communication with primary care is effective. Similarly, omissions resulting from patient preference - such as declining invasive or risky investigations - should be viewed as expressions of shared decision-making, not as unfinished care. Finally, given physicians' broader scope of responsibility for diagnosis and therapy, omissions in their work can carry greater potential clinical consequence and moral weight, reinforcing the need to consider context, intent, and interprofessional dynamics when interpreting what constitutes "care left undone."

4.4.5 Strengths and limitations

One of the significant strengths of this scoping review is its use of a rigorous and structured framework proposed by Arksey and O'Malley, which includes a comprehensive database search. Additionally, the search strategy was collaboratively developed with the involvement of an experienced librarian. All articles were assessed systematically, adhering to predefined in- and exclusion criteria based on the PCC-framework. The quality of the included studies was systematically and critically appraised using the MMAT tool by both the reviewers as well as an external independent expert.

Several limitations must be acknowledged when interpreting the results. First, while the overall quality was reasonable for most studies (see Table 4-2), a significant limitation is that the level of evidence remains low and very scarce; none of the studies could examine causality and most studies relied on unvalidated tools or anecdotal evidence and poor designs. Only one of the eight studies was primarily focused on the concept of unfinished care among physicians; while the other studies mentioned the concept, it was clear that it was not central to their manuscripts. This severely limits the external validity of the findings.

Second, in almost all of the included studies, inconsistent definitions and descriptions of physician roles were used. Many primary studies did not clearly specify the seniority, specialty, or employment status of participants - such as distinguishing between residents, attending physicians, or consultants - nor did they clarify whether participants worked in teaching hospitals, community settings, or mixed environments. This lack of detail complicates interpretation, as the nature and drivers of unfinished care are likely to vary according to professional experience, scope of practice, and organisational responsibility.

Third, a significant selection bias in the studies may be present for multiple reasons. In the search strategy, various known synonyms of unfished care were included where unfinished care typically refers to unintentional and implicit omissions, i.e., tasks or treatments that healthcare professionals intended to complete but were unable to due to systemic barriers, workload, or fatigue. Studies that did not adopt any of the included terminology or related concepts or utilised different perspectives to explain or describe the concept of unfinished care, such as integrated systems, structural theories, and ecological theories, may be lacking in this overview, potentially inducing bias. Furthermore, only articles published in English were included, which may have led to the omission of relevant studies available in other languages. Grey literature was likewise excluded, a pragmatic decision aimed at ensuring transparency, replicability, and a manageable screening scope. Nevertheless, these restrictions may have introduced language and publication bias and limited the inclusion of potentially relevant evidence from non-indexed or unpublished sources.

Finally, the choice of a scoping review design inherently shapes the nature and interpretation of the findings. This approach was deliberately selected to map a conceptually diffuse and underexplored field, rather than to synthesise effect sizes or evaluate intervention efficacy, as would be the aim of a systematic review. The

scoping design enabled a broad and inclusive overview of how unfinished care among physicians has been defined and studied across diverse methodological traditions. However, it also implies certain limitations: the evidence cannot be pooled quantitatively, and causal inferences regarding antecedents or outcomes cannot be drawn. Instead, the emphasis lies on identifying conceptual patterns, gaps, and directions for future research. This interpretive boundary should be recognised when translating these findings into policy or practice.

4.4.6 Implications for future research

To advance understanding and research in unfinished care among physicians, it is essential to develop concepts - the foundational elements of scientific theory - underpinned by empirical evidence and contextual considerations. Conducting concept analysis as a formal linguistic exercise can help identify the defining characteristics that distinguish this phenomenon from related concepts such as underuse or healthcare rationing. Qualitative studies utilizing interviews and focus groups may serve as an initial step in laying the foundations for conceptualisation. The refinement of terminology should be a central focus of future research. The ongoing use of diverse terminologies creates inconsistencies in measurement and hinders cross-study comparisons. Developing a standardized definition of unfinished care through expert consensus methods, such as Delphi studies, could enhance conceptual clarity; while qualitative studies using interviews or focus groups can provide contextual insight.

Cross-disciplinary collaboration is necessary to ensure that a universally applicable framework can be developed and adopted across various healthcare contexts. Developing and validating appropriate methods and instruments for accurately measuring unfinished care among physicians across various settings will be crucial to advance further research. Interdisciplinary frameworks integrating perspectives from human factors, organisational psychology, and clinical systems design could strengthen the theoretical underpinnings of future studies.

In summary, the next research agenda should be explicitly guided by the empirical and conceptual gaps identified in this review. First, addressing the definitional and measurement inconsistencies observed across studies requires systematic concept analysis and consensus-building to establish a unified terminology and validated tools. Second, the limited empirical evidence on prevalence, antecedents, and outcomes highlights the need for robust, multi-site studies that quantify unfinished care using standardised metrics and examine its organisational and psychological correlates. Third, exploring the systemic origins of unfinished care - such as workflow design, staffing policies, and interprofessional coordination - demands interdisciplinary approaches grounded in human factors and systems thinking. Together, these directions translate the observed fragmentation in the evidence base into a concrete and actionable research roadmap for the study of unfinished care among physicians.

Implications for policy and practice

Although the present review did not aim to formulate policy recommendations, the identified knowledge gaps have clear implications for workforce and governance agendas. Understanding how unfinished care manifests among physicians may inform future initiatives related to staffing adequacy, interprofessional collaboration, and clinical accountability.

4.5 CONCLUSION

This scoping review provides the first comprehensive synthesis of how unfinished care has been conceptualised, measured, and empirically examined among physicians in acute care hospitals. Conceptual clarity was limited, with heterogeneous terminology, unstandardised instruments, and inconsistent descriptions of physician roles. While care left undone has been extensively investigated in nursing research, its translation to the medical profession remains embryonic. The findings highlight that unfinished care among physicians is both common and multifactorial, shaped by organisational pressures such as workload, communication, and resource constraints, as well as by individual factors including burnout and fatigue. Yet, the limited conceptual development and methodological diversity preclude firm conclusions regarding its prevalence or its precise consequences for physicians and patients. The variability in terminology reflects deeper conceptual fragmentation within the field. This heterogeneity hampers cumulative knowledge building and underscores the need for theoretical integration. Understanding unfinished care through the physician lens also expands the scope of existing omission-of-care frameworks beyond nursing, revealing how professional autonomy, cognitive workload, and systemic constraints interact to shape prioritisation and moral distress in clinical decision-making. Unfinished care should thus be viewed not solely as a failure of individual performance but as an emergent property of complex healthcare systems operating under pressure. Future research must focus on conceptual refinement, terminological consistency, and the development of validated measures that capture both the frequency and context of unfinished care.

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Supplemental Material

Supplemental Material 4-1: Search strategy scoping review

Supplemental Material 4-2: Critical appraisal of included studies in the scoping review using the MMAT tool

Supplemental material 4-1 - Search strategy scoping review

PUBMED (via NCBI, including MEDLINE)

Concept 1: care left undone

"left undone"[tiab] OR "missed care"[tiab:~2] OR "unfinished care"[tiab:~2] OR "rationed care"[tiab:~2] OR "omission care"[tiab:~2] OR "missed healthcare"[tiab:~2] OR "unfinished healthcare"[tiab:~2] OR "rationed healthcare"[tiab:~2] OR "omission healthcare"[tiab:~2]

Concept 2: physicians

("Physicians"[Mesh] OR "physician*"[tiab] OR "medical specialist*"[tiab] OR "clinician*"[tiab])

#1 AND #2

EMBASE (via Embase.com)

('rationed care':ti,ab,kw OR 'care left undone':ti,ab,kw OR 'missed care':ti,ab,kw OR 'accountable care organization'/exp OR 'medical error'/exp OR 'commission error'/exp OR 'ethical dilemma'/exp OR 'social value'/exp OR 'omission':ti,ab,kw OR 'oversight':ti,ab,kw OR 'carelessness':ti,ab,kw)

AND

('medical specialist'/exp OR 'physician'/exp OR 'value conflict':ti,ab,kw OR 'ethical distress':ti,ab,kw OR 'moral injury':ti,ab,kw) AND [2000-2024]/py AND ([dutch]/lim OR [english]/lim)

NOT 'conference abstract':it

Supplemental material 4-2 - Critical appraisal of included studies in the scoping review using the MMAT tool

Critical appraisal of included studies using the MMAT tool

Category of study designs	**Methodological quality criteria**	**Brady et al. 2017** [40]	**Dello et al. 2024** [33]	**Feigenbaum et al. 2012** [34]	**Firth-Cozens 1997** [37]	**Ibrahim 2013** [36]	**Shanafelt et al. 2002** [41]	**Walters et al. 2023** [39]	**Wilkinson 1975** [38]
Screening questions	S1	Y	Y	Y	Y	Y	Y	Y	N
	S2	Y	Y	Y	Y	Y	Y	Y	Y
1. Qualitative	1.1	Y			Y			Y	
	1.2	Y			N			Y	
	1.3	Y			Y			Y	
	1.4	Y			N			Y	
	1.5	Y			Y			Y	
3. Quantitative non-randomized	3.1					N			
	3.2					Y			
	3.3					Y			
	3.4					N			
	3.5					Y			
4. Quantitative descriptive	4.1		Y				Y		Y
	4.2		N				N		N
	4.3		Y				Y		Y
	4.4		N				N		N
	4.5		Y				Y		?
5. Mixed methods	5.1			Y					
	5.2			Y					
	5.3			Y					
	5.4			Y					
	5.5			Y					

CHAPTER 5

CARE LEFT UNDONE AMONG PHYSICIANS: AN EXPLORATIVE THEMATIC ANALYSIS

This chapter is published as:

Dello, S., De Smet, K., Sermeus, W. (2025). Care Left Undone Among Physicians: An Explorative Thematic Analysis. *BMJ Open Quality, 14*(4). https://doi.org/10.1136/bmjoq-2025-003657

ABSTRACT

Background

The concept of care left undone has been extensively studied among nurses, limited research has examined how physicians experience and respond when care is left undone. Understanding physicians' perspectives is needed for developing more comprehensive strategies to enhance care quality and safety.

Objective

To explore how physicians conceptualise, experience, and manage care left undone.

Methods

A qualitative study was conducted using semi-structured interviews with 12 physicians active in a tertiary teaching hospital. Thematic analysis was guided by existing literature on missed care but allowed inductive insights to emerge from the data.

Results

Physicians were generally unfamiliar with the term “care left undone,” yet readily identified with the phenomenon when described, conceptualizing it as a routine aspect of clinical practice shaped by time scarcity, competing demands, and professional judgment. High workload, understaffing and a multitude of responsibilities were identified as main antecedents of care left undone. Omissions most frequently involved administrative tasks, psychosocial support, and communication, which were deprioritized relative to diagnostic and therapeutic to mitigate any negative effects on patient outcomes. Strategies to navigate care left undone included implicit triage and task delegation, often framed as expressions of clinical expertise rather than deficiencies. Reported consequences included compromised patient safety, disrupted continuity of care, and adverse emotional and professional impacts on physicians, such as moral distress and burnout. Proposed solutions were identified at the organizational (e.g., staffing, workload reduction, supportive environment), interpersonal (e.g., enhanced collaboration), and patient levels (e.g., health literacy and engagement). A cross-cutting meta-theme of professional identity and role boundaries shaped how physicians perceived, rationalized, and responded to care left undone, highlighting the need for interdisciplinary, context-sensitive interventions.

Conclusion

Care left undone is a relevant yet underexplored phenomenon among physicians active in acute care hospitals. Addressing care left undone requires profession-sensitive approaches that account for differences in role structure, decision-making autonomy, and identity. Quality improvement initiatives should include physicians in the co-design of interventions to ensure they reflect clinical realities and foster engagement.

Keywords

Missed care, physicians, patient safety, quality of care, qualitative research, interprofessional collaboration

What is already known on this topic

- Care left undone is prevalent among physicians in acute care hospitals in Europe.

What this study adds

- Administrative work, psychosocial care, and communication are deprioritised over clinical activities by physicians when facing high workload.
- Physicians' professional identity and expertise was the primary factor shaping prioritization actions in clinical practice.

How this study might affect research, practice or policy

- Interventions to prevent care left undone among physicians must be focussed on improving physician staffing, reducing workload and improving team collaboration.

5.1 INTRODUCTION

The concept of care left undone - defined as essential patient care that is delayed, omitted, or partially delivered - has gained increasing attention in health services research over the past two decades.[1–3] Various terms have emerged to depict this phenomenon, influenced by different cultural factors and conceptual viewpoints.[4–6] Care left undone is seen as both a symptom and a result of limited resources, time constraints, and organizational challenges. It is associated to numerous adverse effects, including reduced patient safety, interrupted continuity of care, and moral distress among staff.[3,7,8]

So far, most research on care left undone has concentrated on nursing populations, using both quantitative and qualitative approaches, with a primary focus on hospital-based care—especially in medical, surgical, and intensive care units.[4,9] Quantitative studies often use standardized instruments such as the MISSCARE Survey [10], the Basel Extent of Rationing of Nursing Care (BERNCA) tool [11] or the Tasks Undone scale[12] to evaluate the frequency and predictors of care left undone. The concept has additionally been investigated in various healthcare environments, including long-term care facilities, home and community settings, maternity services, mental health nursing, and emergency departments.[13–15] Complementary qualitative research has provided insight into the ethical and emotional challenges experienced by nurses when essential care cannot be delivered.[16] Throughout this body of work, various theoretical frameworks have been applied. Despite their contextual and conceptual differences, these frameworks consistently exhibit a common trait: a mono-professional perspective that centres on the delivery of nursing care.[5,17]

In contrast, evidence on care left undone by other healthcare professionals, such as physicians, is limited. A recent study is one of the first to describe the prevalence, antecedents, and consequences of care left undone from the physicians' perspectives[18] The findings indicated that physicians – just as nurses - also struggle to fulfil essential components of patient care, primarily due to constrained resource and high workload demands. These missed elements were associated to adverse effects on care quality, job satisfaction, and physician well-being.

This emerging evidence highlights the necessity of assessing care left undone from a wider, interprofessional perspective. Hospitals depend on highly collaborative, multidisciplinary teams to deliver safe and effective patient care, especially in high-acuity settings where prompt recognition and response to patient deterioration is vital.[19] No single professional group is solely responsible for patient outcomes; rather, quality and safety rely on coordinated efforts of nurses, physicians, and other healthcare professionals[20,21] These findings show that viewing care left undone solely from a monodisciplinary nursing perspective may miss essential dynamics in multidisciplinary care. Moreover, although nurses and physicians often work side by side in the same clinical settings, their experiences, responsibilities, and levels of autonomy vary significantly. Physicians generally have more latitude in planning and prioritizing their work, often making diagnostic decisions, coordination care, and exercising critical clinical judgments. This level of autonomy

allows them greater flexibility in handling their duties, but also brings unique pressures, such as including complex cognitive challenges, ethical considerations, and individual responsibility for patient outcomes. Conversely, nurses function within more structured workflows, often dictated by institutional protocols and hierarchical delegation. These structural and functional differences imply that even in the same hospital setting, physicians may experience and respond to care left undone very differently than nurses. Studying care left undone solely within one professional group risks merging the concept with role-specific definitions, potentially obscuring the interplay of structural and cultural factors across disciplines.

Therefore, it is crucial to explore how physicians themselves conceptualize and navigate care left undone in order to fully understand this complex issue in modern healthcare systems. This will not only address an empirical gap but also enhance interprofessional understanding of care left undone.

The study had three main objectives: (1) to explore physicians' experiences with care left undone; (2) to grasp their views on its effects on patients and healthcare providers; and (3) to identify possible solutions at different levels of the healthcare system. Through this study, we aim to contribute to a more nuanced and context-aware perspective on care left undone, acknowledging that similar systemic pressures can manifest and be perceived differently across various professional roles.

5.2 METHODS

5.2.1 Design and setting

This study employed a qualitative design using semi-structured interviews. The research was conducted in a tertiary care teaching hospital.

5.2.2 Interviewees

A purposive sampling strategy was used to recruit physicians for semi-structured interviews. The sample characteristics are described in Table 5-1. The inclusion criteria were: (1) being a current staff physician and (2) having a minimum of one year of clinical experience. Physicians were contacted either by email or in person, briefed on the study objectives, and invited to participate. Participation was voluntary and no incentives for participation were provided. Recruitment continued until thematic saturation was reached. Saturation was defined a priori as the point at which no new codes or themes emerged in at least two consecutive interviews, and when existing themes were richly developed. After the tenth interview no new codes were identified; two additional interviews were conducted to confirm that the conceptual categories were stable.

Although we sought variation in gender, clinical specialty and seniority (residents and consultants) to capture a breadth of experiences, there was no pre-specified quota for these characteristics because the primary aim was to explore the phenomenon rather than to compare subgroups. The final sample comprised both residents and consultants across surgical and medical specialties, with an equal gender distribution.

5.2.3 Data Collection

The findings presented in this study are based on 12 semi-structured interviews conducted by researchers KDS (male) and SD (male). Both researchers had prior training in qualitative methods and had conducted earlier research involving semi-structured interviews, which provided a solid foundation for engaging in this study. Each interview ranged from 30 minutes to 80 minutes with an average duration of 50 minutes. All interviews took place face-to-face in participants' native language (Dutch) in a private, secure area of the hospital. With the participants' consent, all sessions were audio-recorded and subsequently transcribed verbatim in Dutch to maintain contextual and cultural significance. The audio files and transcripts were stored securely ensuring confidentiality throughout the process.

An interview guide was developed based on a literature review and expert consultation. The guide featured open-ended questions structured around predefined themes. Nevertheless, the interviewer provided participants the freedom to elaborate and bring up new topics as they emerged, facilitating a thorough exploration typical of qualitative research.

5.2.4 Data Analysis

The analysis consisted of two major phases. During the preparatory phase, each transcript was read several times to gain a comprehensive understanding of the respondent's narrative. Narrative summaries were created by KDS and SD to capture the key storylines and already translated into initial concepts.

During the second phase, a set of analytical codes - derived partly from the conceptual frameworks and partly from emerging insights - was used to guide formal coding. KDS and SD independently coded an initial subset of transcripts. Discrepancies in interpretation were discussed in reflexive meetings until consensus was reached; when agreement could not be achieved immediately, codes were revisited after joint re-reading of the relevant text until full consensus was obtained. This collaborative approach supported the reliability of the analysis and facilitated the ongoing refinement of the codes.

Table 5-1 – Description of sample

Respondent no.	Sex	Position	Speciality	Clinical experience (years)
1.	Female	Consultant	Anaesthesiology	12
2.	Female	Consultant	Surgery	30
3.	Female	Resident	Internal medicine	5
4.	Female	Resident	Emergency medicine	6
5.	Male	Consultant	Surgery	30
6.	Male	Consultant	Surgery	14
7.	Female	Consultant	Internal medicine	8
8.	Male	Resident	Internal medicine	3
9.	Male	Consultant	Surgery	15
10.	Female	Consultant	Internal medicine	20
11.	Male	Resident	Surgery	5
12.	Male	Resident	Internal medicine	3

Thematic development followed a constant comparative method, characterized by continual interaction between individual interviews and the developing thematic framework. Although the interview guide was organized around predefined thematic areas drawn from existing literature i.e., conceptualization, antecedents and consequences, the coding process itself occurred inductively. The researchers stayed receptive to new insights from the data, allowing for adjustments to the coding framework during analysis. Consequently, this study utilized a hybrid approach that integrated deductive orientation with inductive discovery.

Throughout the analysis, we engaged in an iterative process, cycling between the empirical data and emerging conceptual insights. This approach allowed for the refinement of themes based both the data and the broader theoretical context of care left undone. This interpretive process was grounded in a subtle realist epistemology, which recognizes the existence of an external reality understood through the subjective experiences of participants and the interpretive frameworks of researchers. To support reflexivity, team discussions were held regularly, an audit trail was maintained to document coding decisions, conceptual development, and shifts in interpretation. These measures enhanced the dependability and confirmability of the analysis.

Coding and data management were supported using ATLAS.ti software (version 24.2.1), which provided a structured and transparent environment for handling qualitative data.[22] This study was reported following the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [22].

5.2.5 Ethical Considerations

The study protocol was approved by the Institutional Review Board of the University Hospitals Leuven (MP028138). Written informed consent was obtained from all participants, and confidentiality was ore-served by de-identifying transcripts and storing data on a secure, password-protected server only accessible to the research team.

5.2.6 Patient and public involvement

Patients were not involved in the conduct or analysis of this study.

5.3 RESULTS

Next to the predefined themes, i.e. exploring physicians' conceptualisation of care left undone, conditions or antecedents shaping care left undone, consequences of care left undone, proposed solutions, and measuring care left undone, one new theme emerged, which was labelled "navigating care left undone". A cross-cutting latent meta-theme - professional identity and role boundaries - emerged as a key perspective through which participants understood and addressed care left undone. The identified themes are visually mapped in Figure 5-1, providing a conceptual overview of the themes and their relationships. A more elaborate in-depth description of the various themes is presented below and supported by illustrative quotes to exemplify analytical points.

5.3.1 Physicians' conceptualisation of care left undone

Most physicians were unfamiliar with the term of "care left undone" when it was first introduced to them at the start of the interview. Several respondents expressed initial confusion, asking for clarification or speculating about the meaning suggesting that the concept was not known or familiar to them as such. Despite the initial unfamiliarity with the term, many physicians quickly recognised the underlying concept when it was explained to them and examples were provided, indicating that while the formal term care left undone was not commonly known among physicians, the concept itself did resonate with them. One participant explained: *"Even though I haven't heard that term before, I think we all experience it at some point in time." (Respondent 10, Consultant).*

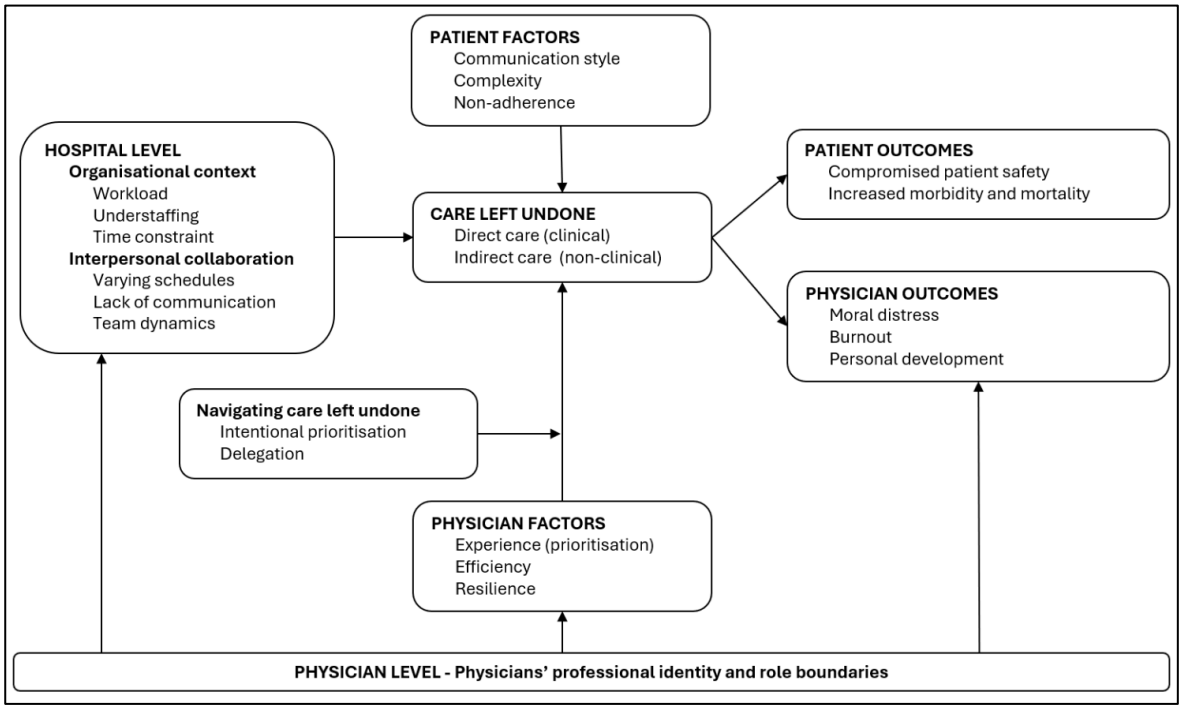

Figure 5-1 - Visual mapping of identified themes.
Note: The themes related to the prevention of care left undone and measuring care left undone are not visually represented as there was no clear directional relationship with the other themes.

Several physicians described experiences of care being postponed, skipped, or de-prioritized due to various reasons. Their definition or description of care left undone was influenced by professional standards and the unspoken limits of medical practice. Some referred to clinical acts (e.g., delayed diagnostics) as examples of care left undone. "*When I think about care tasks left undone, the first thing that comes to mind is post-op checks, such as neurovascular status." (Respondent 2, Consultant).* Others mentioned communication, teaching, psychosocial care or administrative as examples of elements of care being left undone. Most physicians acknowledged that the latter also constitutes an important part of the care they provided but that these elements were often deprioritized in favour of clinically related tasks as those were at the top of their priorities. "*If you don't have much time, your primary task will be your medical duties. You won't neglect the other tasks, but you will simply spend less time on them." (Respondent 12, Resident).* The lack of timeliness for providing surgical care was also seen and conceptualised as a form of care left undone. While procedures were not omitted, physicians mentioned that if surgical interventions were delayed beyond a point that is clinically desirable, it also felt like care left undone. Table 5-2 provides a summary of how physicians conceptualise care left undone.

Table 5-2 - Conceptualisation of care left undone by physicians

Domain	Category	Description
Clinical	Clinical acts / timeliness	CLU understood not only as omissions but also delays in performing core clinical tasks in a timely manner
	Communication (clinical)	Information exchange directly relevant to patient care and clinical decision-making
Non-clinical	Administrative tasks	Required documentation and administrative task; often deprioritised in favour of medical duties yet identified as relevant and important
	Teaching / supervision	Educational interactions and training responsibilities (mainly for consultants)
	Psychosocial support	Providing holistic or emotional, talking to patients and family, providing education to patients and family
	Coordination / follow-up	Interdisciplinary handovers, interpersonal collaboration

5.3.2 Navigating care left undone

Parallel to physicians' conceptualisation of care left undone, a second theme emerged describing strategies to manage and navigate care left undone in practice. Intentional prioritization, especially in situations where physicians were exposed to high workload and time constraints, was the most frequent adopted and mentioned strategy. Physicians articulated that they intentionally chose to omit some elements of care - even medical care - framing these choices as professional judgments rather than mistakes. This implicit triage, rooted in clinical judgment, expertise and professional responsibility, exemplifies a risk-based prioritization framework whereby physicians prioritize core medical tasks ensuring minimal impact on patient safety, morbidity and mortality by strategically deferring tasks considered less urgent. One respondent mentioned: *"Yes, exactly. I think that is a very important quality of a doctor, right? Of a good doctor, to be able to filter well in that. Sometimes you must rationally choose not to do something - that's also professional and good medical conduct." (Respondent 8, Resident).*

Consultant physicians often noted that they were simply unable to perform all tasks they are in theory required to do, thereby forced to delegate tasks - both clinically and administrative - onto junior doctors or other staff. *"We supervise a team. It is impossible for me to see all the people who are seen each year. So, I am very dependent on others in my team." (Respondent 10, Consultant).* Delegation was generally viewed as a safe and effective strategy to navigate care left undone by consultants. One participant mentioned: *"A lot gets delegated, of course. We delegate many tasks to residents and our secretarial staff takes over quite a bit as well. I try to delegate as much as I can. So in essence, there aren't many tasks I fail to complete in some way." (Respondent 9, Consultant).* While other acknowledged that certain risks were associated with delegation. *"You might relay something that you want to be carried out, only to find that it hasn't been done. It often turns out that people either forgot about it or misunderstood the instructions." (Respondent 10, Consultant).*

Some physicians reported utilizing mental lists or casual note-taking methods to monitor tasks that were postponed or missed during a shift. These prompts helped them in following up later when circumstances permitted: "*I carry a piece of paper in my pocket where I circle tasks to do and cross them off when done." (Respondent 4, Resident).*

5.3.3 Conditions leading to Care left undone

Physicians recognized that a mix of organisational characteristics, interpersonal collaboration, physician related traits, and patient-related factors affected whether some aspects of care were left undone. These conditions often overlapped, with various factors interacting simultaneously. At the organizational level, participants highlighted high workload, understaffing, time constraints and a multitude of responsibilities – i.e. administrative, clinically and academically - as primary antecedents for leaving care undone. As one participant noted: "*It's simply the workload, the combination that you can only be in one place at a time. And really, that's not enough." (Respondent 2, Consultant).* Another added: *"We're dealing with a selective burden here, having to take on far more tasks than others. The idea of a 38-hour workweek is a complete illusion. We're expected to do extensive research, management, and teaching, all while running a full-time clinical practice - essentially doing multiple full-time jobs." (Respondent 9, Consultant).* Physicians indicated that practicing outside their typical scope of practice - when substituting for absent colleagues or moving between departments as a result of understaffing increased the risk of unintentional omissions in patient care. *"If you're the anaesthetist for a procedure you don't often do, you may forget or overlook certain things. Not intentionally, but it happens." (Respondent 1, Consultant).* Related to this experience, is the phenomenon of residents mentioning that their responsibilities were often poorly described, resulting in some elements of care being unknowingly left undone. *"As a resident, you have a somewhat defined set of tasks you try to complete as thoroughly as possible - like writing follow-up notes, reports, and letters - but there are always extra responsibilities added, often vaguely defined, small things that aren't always clearly communicated in advance." (Respondent 8, Resident).* Lastly, physicians also mentioned technological barriers, like slow and cumbersome electronic health records, negatively impacting their ability to complete administrative tasks promptly. *"…but the electronic health record is often so slow. It's just not pleasant to work like that." (Respondent 1, Consultant).*

On the level of interpersonal collaboration, varying work schedules among clinical staff, lack of communication and team dynamics, were identified as three major elements leading to care being left undone. Differing work schedules among team members created structural incompatibilities that hindered collaboration and resulted in care left undone. *"We all work at a different rhythm. Nurses are there during the day, physio comes by appointment, but as physicians we have no limits in terms of hours. That makes collaboration difficult sometimes." (Respondent 5, Consultant).* Physicians reported working in complex multidisciplinary settings where ambiguity about task division may result in missed care. When roles were unclear, some actions were presumed to be the responsibility of others and, as a result, were inadvertently overlooked. One participant noted: *"The nurse apparently had observed a significant wound but forgot to communicate it during the shift change. In my clinical examination I did not look for it, as I presumed the nurse checked for it, and as I hadn't heard anything I presumed everything was fine. Which in hindsight it was*

obviously not…". (Respondent 4, Resident). Related to team dynamics were the dynamics between consultants and residents. Consultants have the responsibility of supervising residents and often rely on the resident's clinical judgement. When supervising responsibilities were not feasible, consultants acknowledged that some elements of clinical care were left undone. *"I believe we accompany 70-80% of the residents during consultations, especially in supervisory consultations […] However, sometimes when you review the letter afterward from a patient you didn't see, you think... If you had nothing else to do at that moment, you would certainly go along and redo part of the examination." (Respondent 6, Consultant).* Residents from their perspective mentioned that lack of supervision also lead to suboptimal and potentially incomplete care. *"I spent my first two years in a poorly supervised hospital where you're essentially thrown in the deep end. […] in those early years, due to my inexperience and the lack of someone to fall back on, things were inevitably missed or left undone." (Respondent 4, Resident).*

On the individual level, physicians believed that traits such as personality, resilience, and clinical experience and efficiency attributed to whether care was left undone or not. *"You have internists who write letters listing 15 items, trying to explain or at least mention every single abnormal lab value—even when it has no diagnostic or therapeutic relevance […] But I think that's also part of the learning process, […] knowing what truly matters and what doesn't." (Respondent 8, Resident).* More experienced physicians tended to demonstrate greater confidence in establishing boundaries and prioritizing tasks, whereas more junior physicians often found themselves overlooking non-urgent tasks or struggling to balance competing priorities. Cognitive fatigue influenced task prioritization, physicians noted that exhaustion or cognitive overload after long shifts could result in delays or omissions. One participant mentioned, *"After a heavy shift, your focus is reduced. Then you're more likely to forget or postpone things."* (*Respondent 4, Resident)*

Finally, patient-related factors - particularly regarding complexity, co-morbidity, expected non-compliance, cultural barriers, assertiveness and communication style - also influenced decisions to leave care undone. In some cases, physicians deliberately chose not to perform certain interventions when they believe that follow-up would be futile. As one explained, *"If I sense that the patient won't follow through, I sometimes don't even start it." (Respondent 2, Consultant).* Some physicians noted that patients who were more passive or deferential tended to receive less rigorous follow-up, while more vocal or informed patients often prompted more intensive monitoring and investigation; as one physician noted: *"You notice, patients who are more on the background and who kind of surrender to the doctor and say, go ahead, I'm listening. That's where there may already be some short cuts in terms of follow-up, in terms of control imaging, for example. [...] Whereas there are patients who have already fully read their own file through the app and know every letter and have written everything down. [...] I am 100% convinced that that is the difference in terms of the care that is provided.*" *(Respondent 8, Resident).*

5.3.4 Consequences of Care Left Undone

Consequences of care left undone emerged at both the patient and professional level. Physicians readily acknowledged that omissions in care could compromise patient safety by contributing to delayed diagnostics, disrupted continuity, and insufficient follow-up. While the severity of potential consequences was debated - some considered them low-risk, others serious - some physicians, mainly residents, recognized the risk of increased morbidity and mortality. *"[…] if sometimes there has not been enough attention for a patient by a doctor, that that really has consequences for a patient. […] I think that does have a big influence, non-lent care on patients. Definitely." (Respondent 3, Resident)*. Another participant added: *"Yeah. Yeah. Sorry, but people will have died. Because of me and because of other people. […] Yeah. I'm pretty sure of that. Not that I can think of anyone. […] I am confident care left undone impacts morbidity and mortality" (Respondent 4, Resident)*. However, such assertions were often voiced cautiously or framed as hypothetical, reflecting uncertainty about the timing, visibility, and attribution of adverse outcomes.

Not all consequences were immediately visible or clinical in nature. Physicians emphasized that omissions in patient communication, shared decision-making, and psychosocial support—particularly in sensitive domains like oncology—often go unnoticed yet may erode the quality of care. *"For example, with oncological patients, the social aspect is very important... but I think many of my colleagues never ask about the psychological aspect.*" *(Respondent 12, Resident).* Consultants often emphasized that they triage consciously and felt that direct physical care was rarely - if at all - jeopardized. "*I think, as far as the clinic is concerned, that's pretty good. I think that I definitely... That's still my number one priority. You're a clinician, you're a doctor, you're trained to do that. So I really try to draw a hard line for myself, that I don't let... come at the expense of many other tasks that you're assigned" (Respondent 6, Consultant).* Additional reflections, that emerged both from residents as well as consultants' experiences, arose on instances where patients perceived their care to be compromised or left undone, even when this was not the case. Physicians mentioned that patients who were only seen by residents during post-operative follow-up sometimes assumed that their care was deprioritized or incomplete due to the absence of a consultant during their stay. *"It's not uncommon to hear patients say, 'I haven't seen a doctor in days,' even when that's not true — it's just their perception because contact has been so limited." (Respondent 12, Resident).*

On a personal level, physicians felt discomfort, guilt, moral tension or frustration when forced to leave care undone as this conflicted with their professional standards. This moral discomfort was particularly pronounced when omissions involved aspects of care deemed central to their responsibilities or when they impacted vulnerable patients. *" You might curse when you haven't carried out a medication review and then it turns out the patient becomes completely delirious because medication was stopped that shouldn't have been stopped or vice versa." (Respondent 7, Resident)*

Some physicians viewed care left undone as a trigger for introspection and professional development, particularly when omissions became apparent during supervision, peer discussions, or patient feedback. *"I don't think that it accumulates. I think you try to learn from everything, and... I think that over the years, on one hand, you become better at dealing with complications, and on the other hand, probably through experience, you better know what to look out for and what not to. I think it's also a bit of a learning process. I don't think it's cumulative, I don't think so." (Respondent 6, Consultant)*

Over the longer term, physicians appeared to adopt a more reflective attitude towards the inevitability of leaving certain care undone, recognizing it as an integral part of clinical decision-making rather than a personal shortfall, fostering both emotional detachment and deeper self-awareness. Rather than viewing care left undone as a sign of failure, experienced physicians increasingly described it as a consequence of working within real-world constraints - where clinical judgment must constantly be balanced against structural and interpersonal limitations. As one resident noted: "*Because you are trained with the idea that you will become the perfect doctor. Well, you really have to be very caricatural, so that is not the case. But that you let go of that, because that is simply not possible." (Respondent 7, Resident).*

Some experienced it as a cumulative burden - leading to stress, burnout, inefficiency, and a sense of helplessness due to unaddressed systemic barriers. *"In your first year, you really experienced that. Here I missed something, there I missed something, am I already a good doctor? Yes, and indeed, if that accumulates, I think that sometimes it can indeed lead to... Yes. That it can lead to burnout or even to quitting the training." (Respondent 4, Resident).*

5.3.5 Preventing care left undone

When participants were asked to think about potential solutions to prevent care left undone, common themes applicable on the level of the organisation, interpersonal collaboration, and the patient-level emerged. On the organisational level, three main subthemes were identified, i.e. increasing physician staffing, reducing workload and creating a safe and supportive work environment. Increasing staffing was the primary and most common intervention brought forward by both residents and consultants. While they believed this would be the most effective strategy, they immediately acknowledged the limited feasibility of this suggestion, as staff shortages are a widespread and longstanding problem. *"And that is more staffing, so lowering the workload. But I realise it is a utopian idea." (Respondent 1, Consultant).*

Reducing workload was the second intervention proposed by physicians and deemed to be modifiable. Two main strategies to reduce workload were identified: first, reducing administrative burdens and red tape through enhanced automation and supportive electronic health records (EHRs). Cumbersome EHR systems were frequently mentioned as a barrier to promptly complete mandatory administrative tasks, which were often perceived as excessive, repetitive, irrelevant and detracting from core clinical tasks. *"Administration is not just time-consuming, it's also demotivating. It doesn't feel like a core part of the medical profession to*

constantly fill out forms and insurance paperwork. […] Nowadays, you have to document everything everywhere, and that makes the administrative side particularly burdensome." (Respondent 12, Resident). The second strategy to reduce workload was to conduct a critical evaluation of follow-up practices to ascertain which patients genuinely necessitate specialist oversight. *"As physicians, we need to reflect more critically on which patients truly require follow-up in a tertiary hospital. We often default to doing it ourselves, even when it may not be necessary. There's little guidance in the literature, so everyone does it differently—but I believe there's room for much more efficiency." (Respondent 9, Consultant)*.

Lastly, the third subtheme on organisational level to prevent care left undone that emerged primarily from residents' experiences was fostering a supportive and safe environment. They often felt that lack of supervision impacted their ability to provide safe patient care. In addition they mentioned the need for a more open and constructive culture, where making mistakes could be openly addressed and was no longer stigmatized. "*We just do our thing and don't dare to ask, but in the end… why wouldn't I dare to ask? You should have the space to not know. (Respondent 4, Resident).* One resident also highlighted that training and evaluation of residents should be decoupled and done by independent organisational bodies, rather than by the same institutions as is currently the case. *"Hospitals should have incentives - like in the Netherlands - to take good care of and properly train their residents." (Respondent 11, Resident).* Related to this last subtheme was improved medical training for physicians, not only focusing on addressing medical problems, emphasising the need for a holistic approach and focus on communication, also during medical training. This was both mentioned by residents as well as consultants.

On the interpersonal level, improved communication and more efficient collaboration between health professionals were the most frequently mentioned interventions. Physicians readily acknowledged that collaborations with other health professionals were often not developed enough to actually be efficient and positively impact patient care. *"Everyone wants the best for their patients, but they tend to work within their own silo. It often feels like a constant struggle with others, even though many of us are doing similar work. There's a real need for better collaboration and a more integrated, overarching organization." (Respondent 9, Consultant).*

Two divergent streams of beliefs among physicians became apparent when asked about whether patient themselves might be part of the solution to prevent care left undone or not. Some physicians believed patients themselves had no impact on whether care would be left undone or not. *"I don't think you can ever assume that you can guide or […] The patient population is so heterogeneous - it includes the most extreme ends of society. We shouldn't expect patients to adapt to us or to the hospital as an organization. Any adjustments or support should primarily come from us, or at the very least, from the organization." (Respondent 3, Resident).* In the other case, physicians believed there was a role and responsibility for the patient. Social support - often cited as being left undone or deprioritised - could be enhanced by strengthening the involvement of family and friends and improving professional guidance. In addition,

physicians recognized the value of early health education, including instruction on about shared decision and the development of more effective communication strategies to improve patient care and reduce the risk of care being left undone.

5.3.6 Measuring care left undone

Physicians shared different perspectives on how care left undone would be best assessed in medical practice. While several participants recognized the potential benefits of identifying and monitoring care omissions, they also expressed concerns about unclear definitions, the feasibility of measurement, and the risk of misinterpretation. An important challenge mentioned by multiple respondents was the difficulty in defining what constitutes care left undone in the context of medical decision-making, and that not all the care they ought to provide is provided at a fixed time. As one consultant described: *"You can't make a checklist for everything I didn't do. What I didn't do depends on what I knew at the time." (Respondent 6, Consultant).* Physicians pointed out that their work entails ongoing triage and is fluid in nature, meaning that what remains undone frequently depends on changing clinical evaluation. This view was reflected in other interviews as well, as respondents doubted the relevance of predefined checklists or tools to their very diverse, fluid and extensive responsibilities.

Despite some concerns, participants offered potential methods for assessing care left undone. Suggestions included post-consultation checklists tailored for high-intensity departments, such as emergency care, as well as peer-based strategies as team debriefings or reflective discussions. One re-occurring suggestion from various physicians was to resort to more qualitative research methods in order to attempt capturing which care was left undone or not. Others mentioned the use of proxy indicators - such as delays in discharge, missed follow-up, or readmissions - as indirect signs of care left undone. Many participants also proposed that tools should incorporate options for annotating or explaining the reasons behind omitted care. Alongside these tool suggestions, physicians emphasized the necessity of collaborative development. Several respondents noted that any attempt to measure care left undone should involve practicing clinicians to ensure the tool accurately reflects real-world decision-making. One interviewee noted, *"A measurement tool could help, but it must be developed with us, not for us." (Respondent 10, Consultant)*

Some physicians pointed out obstacles to utilizing CLU measurement, particularly the concern that these tools might be used for comparisons or accountability, neglecting the nuances of clinical complexity. They expressed concerns that measurements might be used to audit or evaluate individuals without considering the context. As one resident put it, *"If you measure care left undone, and just see a percentage, then it will be used to compare doctors. But that's not fair." (Respondent 10, Consultant)*

5.3.7 Professional Identity and Role Boundaries: a cross cutting meta theme

All six themes highlighted the crucial role of professional identity in influencing how instances of care left undone were perceived and handled. Physicians established clear distinctions about what considered "medical" care, impacting which omissions were recognized, justified, or seen as ethically concerning. Tasks perceived as outside the physician's responsibilities - like providing psychosocial support or regular documentation - were more likely to be deprioritized, while clinical decision-making and direct diagnostic or therapeutic actions were protected.

These distinctions not only outlined the limits of acceptable omission but also influenced reactions to potential measurement and intervention strategies. For example, structural differences in managing professional time - such as nurses working fixed shifts compared to physicians with flexible hours - impacted collaboration and the handover processes. As one surgeon explained, *"We all work a different rhythm…as physicians, we don't have any boundaries in terms of working hours". (Respondent 5, Consultant).* This misalignment complicated joint task completion and led to fragmented care.

Besides the practical consequences of these structural differences, several participants noted the cultural divide between the physicians and other staff members. One consultant expressed rising concern that the ethos of pushing boundaries, which has long been part of the physician identity, is increasingly misaligned with the broader norms of the hospital: "*But on the other hand, it is also frustrating that we just keep working, regardless of our hours. We just keep going. I think so too, there is a serious contrast between how we as doctors work and how the rest of the entire hospital works. The rest of the hospital says at six o'clock, I'm done, I'm going home. We don't." (Respondent 9, Consultant).*

5.3.8 Perspectives of residents and consultants across themes

Although this study was not originally designed to compare differences in care left undone between consultants and residents, the analysis revealed meaningful contrasts between the two groups across several themes. In certain themes - such as the one exploring how physicians navigate care left undone - a clear divergence in perspectives emerged, revealing that consultants and residents employed distinct strategies to manage or mitigate unfinished care. Conversely, for other themes, such as the conditions leading to care left undone, there was notable convergence, with both groups expressing similar views on the primary drivers contributing to this phenomenon. Table 5-3 provides a non-exhaustive overview of the most important elements where residents and physicians shared either divergent or more converging perspectives on the identified themes.

Table 5-3 - Perspectives of consultants and residents across themes

Theme	Consultants	Residents	Shared perspectives
Conceptualisation of CLU	Framed as a **systemic/organizational issue** (workload, admin burden, system delays)	Described in **task-oriented terms**, linked to daily workload and supervision	Both initially unfamiliar with the term but quickly recognised the phenomenon once explained
Navigating CLU	Relied primarily on **delegation**	Relied on **personal coping strategies** and supervision	Both emphasized **triage and prioritisation, autonomy** as a core medical responsibility
Conditions leading to CLU	**Structural barriers**: staff shortages, multitasking, IT inefficiencies	Stressed **role ambiguity, lack of supervision, and inexperience** as amplifiers of omissions	Both identified **high workload, time pressure, and understaffing** as key drivers
Interpersonal collaboration	Concerned with **limits of supervision** and dependence on residents' judgment	Reported **insufficient supervision** and unclear task division	Both noted **team communication problems** and mismatched schedules as causes of CLU.
Individual factors	More experienced, confident in **setting boundaries** and prioritising consciously	Reported **fatigue, overload, and uncertainty**, making omissions more likely	Both acknowledged that **personal traits, resilience, and efficiency** shape the likelihood of CLU
Patient-related factors	Sometimes chose not to intervene (e.g., futility, expected non-compliance)	Reported patient assertiveness influencing task completion	Both noted **patient complexity, communication barriers, and engagement** affected CLU
Consequences of CLU	Framed omissions as rarely jeopardising **core clinical care**, but reputational and medico-legal risks were salient	Expressed stronger concerns about **patient safety, morbidity, and mortality**	Both described **moral discomfort, guilt, and frustration** when forced to leave care undone
Preventing CLU	Proposed **system-level reforms** (staffing, workload reduction, better IT)	Emphasised **supervision, safe training environments, cultural change**	Both highlighted **more staffing, reduced admin burden, and improved collaboration**
Measuring CLU	Expressed scepticism about feasibility and contextual variability	Some openness to structured tools for reflection and training	Both raised **concerns about misinterpretation, unfair comparisons, and audit use**
Professional identity	Defended autonomy, set boundaries around what counts as "medical" care	Framed CLU as part of **role transition and identity formation**	Both recognised that **professional role shapes which tasks are deprioritised**

5.4 DISCUSSION

This study explored how physicians conceptualize, perceive, experience, and manage care left undone. Although the term “care left undone” was largely unknown to participants, their narratives demonstrated an unspoken connection to the concept. The findings provide new insight into how physicians prioritize and navigate care left undone, which is frequently influenced by their professional identity, systemic pressures, and collaborative interactions with other professionals. The results from this study are predominantly in line with established empirical evidence in the context of nursing care left undone, albeit some are divergent. Importantly, these qualitative findings also complement emerging physician-specific evidence - including recent prevalence studies of care left undone among physicians[18] - by providing explanatory depth to the patterns previously documented quantitatively. Whereas the earlier work established how common care omissions are and identified predictors such as job strain and staffing shortages, the present analysis clarifies the processes through which physicians recognise, rationalise and cope with such omissions in daily practice.

5.4.1 Antecedents & mechanisms

Our results identified workload and understaffing as main organisational elements contributing to care being left undone by physicians. Similarly, in most studies describing the antecedents of nursing care left undone high workloads and staffing shortages, were also identified as key elements contributing to missed nursing care.[2,23,24] This convergence underscores the structural nature of care left undone and its roots in healthcare delivery systems that favour throughput and efficiency over the relational and contextual aspects of care. The findings in relation to the association between teamwork and care left undone also align with those established in nursing research, where teamwork and interprofessional collaboration are seen as important interventions to improve quality of care and reduce care left undone.[25]

Emerging evidence has recently shed more light on how nurses prioritize the care they provide when exposed to a high workload with limited resources. Nurses' decisions are influenced by complex structural preferences that interact with task type and personal decision-making style.[26] It is a multifaceted process, influenced by nurses’ educational background as well as the patients’ health condition.[27] Similarly, our results demonstrate that physicians actively engage in real-time prioritization, drawing on clinical judgment and expert knowledge to navigate competing demands and take the context of the patient into account. These parallels suggest that, in many cases, care left undone may not represent a simple deviation from standards, but rather a contextually grounded response to systemic constraints. While the specific manifestations differ across professional boundaries, both nurses and physicians make prioritization decisions shaped by workload, role expectations, and clinical judgment.

When looking more specifically at what type of tasks were left undone, similar patterns – as established both in research on nursing care left undone as well as patterns identified in physician care left undone - were

identified.[4,18,28] Medical tasks with a direct effect on clinical outcomes were consequently prioritised over other medical task perceived as less important as well as psychosocial care and administrative tasks. These findings confirm that physicians - much like nurses - differentiate between various types of care when making decisions under constrained conditions, and that this categorization aligns with the professional norms that outline their core responsibilities.

5.4.2 Consequences of care left undone

The findings of this study reveal that physicians are aware of the potential consequences of care left undone, though they often express these concerns with a degree of caution and uncertainty. While some participants - -particularly residents - acknowledged that omissions could lead to delayed diagnostics or even mortality, these assertions were frequently framed hypothetically, reflecting the complexity of attributing outcomes to omissions in care. This contrasts with the stronger empirical associations established in nursing research, where missed care has been consistently linked to increased morbidity and mortality, especially in post-operative contexts.[3,29] From this perspective, physicians' hesitance to draw causal conclusions may reflect both epistemic humility and the inherent difficulty of tracing harm in complex clinical trajectories. These reservations are not unfounded: as highlighted in missed nursing care research, directly linking specific care omissions to adverse outcomes is methodologically challenging due to confounding variables and the often indirect or delayed nature of the consequences. Although associations between missed care, low staffing, and negative outcomes like readmissions and mortality have been documented, the underlying mechanisms remain poorly understood, and objective measures of omission rarely capture the full clinical context.[2,3,30] Therefore, both the detection of missed care and the estimation of its impact must be approached with caution, acknowledging that what is not done may remain invisible until consequences surface, if they do at all. Physicians highlighted that omissions in emotional support, shared decision-making, and patient communication - forms of care often less visible – may also compromise the quality of care and in addition undermine the physician-patient relationship. Furthermore, the current study builds prior research by revealing that patients sometimes perceive their care as substandard or neglected, even in the absence of objective omissions.[31]

The impact of care left undone was not only a clinical concern for physicians but also caused moral and psychological strain on them. Participants reported guilt, frustration, and moral tension, particularly when omissions affected vulnerable patients or core professional tasks like medication reviews or end-of-life discussions. These experiences mirror nursing research findings, where care left undone correlates with emotional exhaustion, moral distress, and burnout.[32,33] However, important distinctions exist. Nurses - often in closer contact with patients - report stronger moral injury from the immediate visibility of unmet needs. Their distress frequently stems from inability to deliver 'basic' or 'fundamental' care, such as emotional support, hygiene, or monitoring.[34] In contrast, physicians described more varied emotional

responses, buffered by a professional identity oriented around triage and prioritization. Rather than seeing omissions as personal failings, they framed them as systemic consequences requiring boundary-setting. This tendency to attribute omissions to system-level factors may also reflect limited psychological safety in medical environments, where acknowledging personal errors transparently is not always culturally supported. This adaptive distancing differs from the sustained emotional dissonance reported by nurses, who may have fewer institutional mechanisms to shield themselves from missed care's moral consequences. For both professions, care left undone can accumulate into psychological burden, contributing to stress, burnout, and attrition. These findings underscore the need for organizational responses that address structural drivers of care left undone.

5.4.3 Capturing care left undone

This study reveals that physicians approach measuring care left undone with conceptual caution and practical concern. While many acknowledged the value of capturing care omissions, they emphasized difficulties applying standardized tools to a clinical role they see as fluid, context-sensitive, and based on ongoing judgment. Unlike nurses, whose work involves structured tasks within defined shifts, physicians stated their responsibilities are diffuse and evolving. In nursing research, care left undone is operationalized through standardised and validated instruments.[12,4,35] These instruments presume role standardization and time-bound deliverables that physicians contested as misaligned with medical decision-making. In response, physicians suggested alternative approaches, including post-consultation checklists in high-pressure environments, qualitative reflection methods, and proxy indicators such as delayed discharge or missed follow-up. Many emphasized that measurement tools should allow for contextual factors and be co-developed with practicing physicians to enhance validity and relevance. This reflects broader critiques about decontextualized metrics in complex professional work. Moreover, physicians expressed concern that measurement might be used punitively, particularly if reduced to simplified indicators without considering situational complexity. This tension between accountability and nuance mirrors debates in healthcare performance measurement but appears pronounced among physicians, who resist reductionist quantification of interpretative work. In contrast, while nurses have expressed concern over managerial use of missed care data, there has been greater professional consensus around its role as an indicator of system stress and patient safety risk.[36] These differences suggest that while care left undone may transfer across professions, its measurement requires profession-specific frameworks acknowledging different epistemologies of care, responsibility boundaries, and practice norms.

5.4.4 Intervention to reduce care left undone

Physicians emphasized the need for increased staffing and reduced workload to prevent care left undone - interventions that have also been proposed in the context of reducing nursing care left undone.[24,37]

Similarly, physicians acknowledged the systemic nature of workforce shortages, describing increased staffing as a desirable yet utopian goal.[38] Physicians proposed workload reduction through specific strategies: automation of administrative tasks and rationalisation of follow-up care. These suggestions resonate with the emphasis on reducing non-essential burdens and optimizing task delegation to allow nurses to prioritize core patient care activities.[39]

No single clinician can provide all the care that a hospitalized patient needs as it requires the input from a multidisciplinary team. Efficient teamwork has been identified as a major premise for safety in health care.[40] Evidence indicates that teamwork, together with other factors such as the quality of the work environment, safety climate, and clinician factors are crucial for both patient and staff outcomes and associated with rationed and missed nursing care.[41] This resonates with what has been found in this study, as fragmentation of interprofessional collaboration and lack of teamwork was identified as a recurring theme in physicians' narratives and also brought forward as an area to focus on to prevent and reduce care left undone. Physicians stressed the need for integrated systems that support shared responsibilities and reduce working in silos.

A key structural barrier identified was the misalignment between professional schedules and the invisibility of shared tasks - such as care coordination or cross-shift follow-up. Physicians described how discrepancies in working hour between disciplines created friction and disrupted continuity of care. These findings highlight a deeper tension: although physicians and nurses operate side-by-side, their perceptions of what constitutes “adequate” or “unfinished” care are shaped by divergent professional norms. Such misalignment also raises questions about how work is distributed between residents and consultants. Residents frequently described high workload and sometimes poorly defined tasks. These observations suggest that current work-hour regulations and role expectations may inadvertently place a disproportionate burden on residents, a dynamic that warrants quantitative investigation of resident task distribution and compliance with duty-hour policies.

Addressing care left undone therefore requires solutions that are not only systemic but also collaboratively developed across professional boundaries to bridge these interpretive differences and enhance team-based care delivery.

5.4.5 Strengths and Limitations

This is one of the first qualitative studies to examine this topic using comprehensive, rich and in-depth interviews through thematic analysis. Nevertheless, several limitations are apparent and need to be addressed. First, the findings stem from a single hospital setting, more specifically a tertiary teaching hospital, where specific dynamics are at play between consultants and residents. These dynamics may not be applicable to non-teaching hospitals. Moreover, as the data were collected in Belgium, results are also limited to one national context. The Belgian system of medical training, particularly the organisation of residency

programmes and the hierarchical relationships between consultants and residents, has unique features that may not be directly comparable to training models in other countries. Findings should therefore be interpreted with caution and not automatically transferred to international contexts. Second, while the sample is diverse in terms of gender, specialty and seniority, the sample may not fully represent the full diversity of physician experiences across different specialties or healthcare systems. The small sample limits the ability to conduct robust subgroup comparison, e.g. comparison residents versus consultants, across specialty, or across gender. Third, while the interviewer–interviewee relationship was carefully managed, the sensitive nature of discussing omissions of care may have introduced social desirability bias, particularly given physicians' remarks about limited psychological safety in their work environments. Finally, qualitative data are context-specific and interpretive; findings should therefore be understood as hypothesis-generating rather than definitive.

5.4.6 Implications for Policy, Practice and Future Research

This study has important implications for understanding and addressing care left undone among physicians. First, it highlights the importance of moving beyond a mono-professional perspective on missed care. An exclusive focus on nurses - as common in the literature - risks overlooking the systemic and interdisciplinary dimension of the problem. Because patient care results from complex collaboration across various roles, strategies to mitigate missed care should consider how different professionals experience, justify, and manage task omissions. Secondly, while physicians showed interest in the potential for measuring care left undone, they pointed out the limits of standardization. Current tools like the MISSCARE Survey, BERNCA or Tasks Left Undone scale, widely used in nursing research, may not adapt well to physician practice due to the flexible and interpretive nature of medical decision-making. Effective measurement in this context may require hybrid approaches, combining quantitative indicators (e.g., missed follow-up or delayed diagnostics) with qualitative or reflective elements that capture contextual nuances.

Finally, the findings indicate that addressing care left undone involves not only structural reform but also cultural change. Physicians' descriptions of internalized responsibility, informal coping mechanisms, and indefinite work hours reflect a professional ethos that prioritizes individual resilience over systemic problem-solving. As one participant pointed out, the disparity between physician practices and those prevalent in the wider hospital culture is increasingly unsustainable. Therefore, interventions designed to enhance care quality should address the underlying norms and identity constructs that shape professional behaviour.

In addition to these practice and policy considerations, several priorities for future research emerge. First, future research should adopt a multidisciplinary lens, explicitly exploring how cumulative understaffing across professions may leave certain patient groups more vulnerable to omissions. Second, larger multi-site and multi-country studies are needed to examine how hospital context, training of medical professionals,

and country-level factors influences and shape physicians' experiences of care left undone. Third, future studies should also take into account the impact of task shifting between physicians and other health professionals, with particular attention to delineating which categories of care are most critical to be performed by physicians themselves and which may be safely delegated to other team members. This also includes examining intra-professional task allocation, for instance how high- and low-priority activities are distributed between residents and consultants, and whether such patterns disproportionately affect resident work hours. Finally, methodological innovation is needed to capture care left undone in ways that respect the fluid, interpretive nature of physician work, potentially combining quantitative indicators with qualitative reflection to provide a more comprehensive understanding of this complex phenomenon.

5.5 CONCLUSION

This study is one of the first to explore how physicians conceptualize, perceive, and respond to care left undone, offering a novel perspective on a phenomenon that has been predominantly studied among nurses. Structural factors - such as workload and interprofessional ambiguity - are similar antecedents to those found in nursing research. Physicians see care left undone not merely as a failure but as a response based on triage, reflecting their professional autonomy and adaptive decision-making. Nonetheless, the emotional stress, coping mechanisms, and informal learning experiences reflect themes that have been previously identified in nursing. Our findings suggest that understanding and addressing care left undone must incorporate a multi-professional perspective that acknowledges a range of care logics, identity boundaries, and structural realities across various roles. Furthermore, as the expanding care left undone literature emphasizes the influence of work environments and decision-making conditions, it is evident that strategies to reduce care omissions should focus on both individual reasoning and systemic organizational change. By broadening the view beyond a single profession, healthcare systems can create more equitable and comprehensive approaches to improve the quality and safety of patient care.

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Supplemental Material

Supplemental Material 5-1: Semi-structured interview guide

Supplemental Material 5-1 - Semi-structured interview guide –

Individual interview with physician in training or consultant level physician in academic or non-academic hospital.

START: [Check ICF is signed and returned beforehand]

Before we begin, I just want to remind you that we will be recording this interview to enable transcription and analysis, and that the recording will be deleted once transcription is complete.

I also want to check if you have any questions regarding the information provided in the participant information sheet?

[Let the interviewee know when you begin recording]

Section 1 - Background questions – introduction

0. What's your current role in this hospital?
1. What is your specialisation?
2. How long have you been working as a doctor in this hospital and many years have you been working as a doctor in total?
3. Are you predominantly working in an inpatient, outpatient or OR setting?
4. Do you have the end responsibility over patients?
5. How many patients are you responsible for?

Section 2 - Understanding the concept of care left undone

1. Have you ever heard of the concept of care left undone?
2. What does care left undone means to you?
    a. *Probing questions:* How would you describe it? Can you provide some examples? Have you ever experienced what you just described yourself?

Section 3 - Antecedents of care left undone

1. In your opinion, which are potential individual level factors that might contribute to leaving care undone? (e.g. workload, teamwork, etc?)
2. In your opinion, which are (if at all) potential patient level factors that might contribute to leaving care undone?
3. In your opinion, which are potential organisational level factors that might contribute to leaving care undone? (e.g. resource allocation, policies, red tape, etc.)

Section 4 – Impact on patients and healthcare providers

1. In your opinion, do you think that leaving care undone has an impact on patients?

2. If yes, how do you think this might manifests itself in patients?
    a. E.g. is it merely related to how they perceive care? Might there be effects on their clinical outcomes?
    b. Probing question: Is there a difference in the type of care that is left undone?
3. In your opinion, do you think that leaving some care undone during your work, has an impact on how your wellbeing?
    a. Probing: Do you think there is a long term/cumulative effect (positive/negative)? E.g. becoming indifferent to leaving care undone, experience anxiety, other repercussions? Did your perception of care left undone changed over time?

Section 5 – Solutions – measurement

1. What do you think could be effective strategies to reduce the prevalence of care left undone?
    a. Probing: do you think interventions should be targeted towards individuals? Towards the organisation? Towards how work is organised?
2. Is using a survey-based instruments an adequate way to quantify the construct of care left undone?
    a. Probing: if yes what is your opinion on the current instrument? [present digital/physical version of current instrument] What could be improved? E.g. disease specific? Or combination of general part and disease specific part? Use of Likert-scale?
    b. If no: what other options are best suited in your opinion?

CHAPTER 6

GENERAL DISCUSSION AND CONCLUSIONS

6.1 GENERAL OVERVIEW

The overarching aim of this PhD study was to explore the concept of care left undone among physicians. More specifically our aim was to clarify the conceptual and theoretical terrain of care left undone in the context of physicians, examine its prevalence and predictors in acute care settings, and finally explore how physicians interpret and experience this phenomenon. This chapter starts by outlining the main study findings followed by the theoretical contributions to the existing literature as well as methodological reflections. The chapter is concluded with an overview of policy implications and suggestions for future research.

6.2 MAIN STUDY FINDINGS

The second chapter provides a physician-specific analysis of the concept of care left undone across six European countries. Linking back to the first research objective of this PhD, one of the first and foremost findings is that care left undone is prevalent among physicians. In total, 78.3% of physicians indicated they left one or more activities undone during their most recent shift. In relation to the patterns of which type of care was left undone most frequently, it was observed that care activities that can be characterised as less structured (e.g. talking and comforting patients) and with presumably no direct impact on the patients physical needs were most frequently left undone compared to activities having a direct impact on patients' physical, where physicians consistently prioritize the latter.[1,2] A second finding is that high workload is manifested as a significant antecedent of care left undone. A 10% increase in reported workload is associated with a significant increase in the odds of care being left undone among physicians. Third, when care is left undone, physicians are more likely to rate patient safety adversely and experience negative outcomes like burnout and job dissatisfaction, which are themselves associated with poor patient outcomes.

In line with our second research objective, and outlined in the third chapter of this PhD, we sought to reveal how the dynamic interplay between job demands and resources contributes to the formation of distinct occupational profiles among physicians and nurses sharing the same work environment - and how these configurations may help explain differences in the experience and prevalence of care left undone. In this chapter, we move beyond linear, variable-centred models and adopt a multilevel latent class model looking at both nurses and physicians simultaneously. On the individual level four distinct job profiles - shaped by specific constellations of job demands and job resources - were identified.[3,4] These profiles align closely with the four quadrants proposed by Bakker and Schaufeli in the JD-R model, inspired by Karasek's job types. 40% of participants aligned with the high strain profile, characterized by high job demands and limited resources. Another 30% identified with the active job profile, experiencing high demands as well as high job resources. The passive jobs and low-strain jobs profiles were the least common. No differences between physicians and nurses were observed in the distribution of these profiles among both groups. Physicians and

nurses who match the high strain profile tend to leave more care undone and have an increased likelihood of burnout and intention to leave the organisation. In addition to the latent job profiles identified on the individual level, four latent hospital groups were identified. Staff in larger and teaching hospitals were more likely to exhibit high-strain jobs, reflecting the complexities of care and organisational demands in these settings. In smaller and non-teaching hospitals, physicians were more likely to have active or low-strain profiles, while nurses were more likely to have high-strain jobs.

The third research objective was addressed through two studies. First, chapter four systematically maps and critically appraises the existing literature on care left undone among physicians through a scoping review. The review revealed a striking scarcity of research on this topic. Across the identified research, substantial heterogeneity in terminology and conceptual clarity was observed, with a range of terms - such as shortcuts, missed opportunities, lowered care standards, and suboptimal care - reflecting inconsistent conceptual boundaries. Only one of the included studies (see Chapter 2), explicitly applied the term care left undone. Furthermore, most studies relied on unvalidated instruments or qualitative reports. Secondly, the fifth chapter offers a thematic analysis of semi-structured interviews, shedding light on how physicians experience and view the concept of care left undone. Both residents as well as consultants indicate that excessive workload, understaffing and a multitude of responsibilities, are primary drivers of leaving care undone. The adverse effects of leaving care undone - both on the level of the patient as well as on the level of the care provider - were highlighted by both residents as well as consultants. Reported consequences included compromised patient safety, disrupted continuity of care, and adverse emotional and professional impacts on physicians, such as moral distress and burnout. A key finding is that physicians often do not perceive care left undone as a straightforward failure, but rather as an adaptive, triage-based response to competing demands and limited resources.

6.3 HOW DOES THIS PHD STUDY ADVANCES THE FIELD OF CARE LEFT UNDONE?

The foundation of the advancement - though seemingly straightforward - resides in broadening the scope of care left undone research to include physicians (Chapter 2, 4 and 5) and, importantly, in examining it from an integrated perspective across both physicians and nurses (Chapter 3) which has not been done so far in both instances. Extending the scope in this way, resulted in three important advancements.

The first major advancement lies in extending and confirming established empirical findings from nursing research to the population of physicians on multiple levels, i.e. the antecedents, consequences and patterns of care left undone as well as the association between the work environment - shaped by job demands and job resources - and care left undone. First, high workload emerged as a key driver of care left undone among physicians.[2] In nursing research it has been extensively established that, workload - mainly manifested through measures such as staffing - is associated with omission of essential care. In addition, it has been

found to be a promising indicator of nurse staffing adequacy.[5] Just as in Chapter 2, in Chapter 5 the qualitative data also revealed that almost all physicians in our sample pointed towards workload as the primary driver of leaving care undone. This finding was further refined in the qualitative study by physicians highlighting that it is not merely the patient load or clinical work that is the driver of workload; rather it's the combination of a multitude of responsibilities, both clinically and administratively that leads to the need for prioritization and leaving care undone.

The consequences of care left undone among physicians were also in line with what has been empirically established in nursing research on both the individual level and the organisational level. Care left undone among nurses is associated with negative individual-level outcomes such as poor perceived quality of care, job and occupational dissatisfaction, as well as with negative organisational outcomes like turnover and intention to leave.[6–8] Although not all outcomes described here were explored in Chapter 2, the results from this chapter yielded similar findings. When physicians leave care undone, we found it to be associated with emotional exhaustion, job dissatisfaction and poor perceived quality of care.[2] In addition, we found that it is not just whether care is left undone that is important but also the number of care activities that are left undone, as we found that more care left undone was associated with an incremental increase in the odds of both burnout and job dissatisfaction.[2] Qualitative studies exploring nurses' experiences when leaving care undone, established that nurses exhibited feelings consistent with moral distress, role conflict, and role strain when faced with the inability to provide complete care for their patients.[9,10] In Chapter 5, we found physicians experience similar feelings of moral distress and role strain when they are confronted with the inability to provide complete patient care.

The pattern of which type of care was left undone among physicians was also remarkably similar to what has been observed in nursing research. In nursing research, it has been established that activities related to psychosocial support and care planning were most frequently omitted, while those involving physical care and monitoring and related to the immediate physical needs of patients - such as patient surveillance and timely medication administration - were less often left undone.[1] The activities with an impact on the immediate physical needs are usually more structured and the required time effort is well defined. Both Ausserhofer et al. (2014) and Abdelhadi et al. (2023) highlight this as additional rationale as to why some care activities are left more frequently undone than others.[1,11] In Chapter 2, we observed very similar patterns of care left undone by physicians, i.e. psychosocial care (e.g., 'Comfort/talk with patients') and 'Documentation of care' are most frequently left undone, while activities related to providing direct care and addressing the physical needs of patients, e.g. 'Pain management' and 'Ward rounds with nurses and other team members' are less frequently left undone. While Chapter 2 revealed these patterns of care left undone, it did not provide data to explain the underlying mechanisms driving these patterns. These explanatory insights emerge in Chapter 5, where physicians offer nuanced accounts of how care is prioritised under time

pressure and competing demands. Here physicians highlighted that clinical care, with direct impact on patient outcomes is always prioritised over administrative tasks or talking to patients and relatives. While they acknowledge the latter is important and is a fundamental part of their job, they consistently indicate that this type of care is systematically deprioritised over care tasks with direct clinical impact.

Second, this dissertation advances the field by introducing a joint analytical perspective on physicians and nurses situated within the same hospital environment. Rather than treating these professional groups in isolation, the multilevel latent class analysis conducted in Chapter 3 allowed for the identification of distinct job profiles shaped by varying combinations of job demands and job resources. This integrative approach enabled a more holistic view of the structural and organisational factors that contribute to care left undone. Importantly, it revealed that while the underlying pressures may differ in intensity or expression between professions, both nurses and physicians are embedded in shared institutional conditions that shape their capacity to deliver complete care. By situating physicians and nurses within a common analytical framework, this research promotes a systems-level understanding of care left undone and opens new possibilities for cross-professional learning and intervention design.

Finally, this work contributes a conceptual advancement by highlighting how professional identity and role boundaries fundamentally shape how care left undone is perceived, rationalised, and acted upon by physicians. The qualitative analysis (Chapter 5) revealed that physicians' accounts of unfinished care were strongly influenced by implicit role expectations and deeply held beliefs about what tasks fall within their professional remit. Activities that fell outside of these perceived boundaries - particularly relational or routine care - were often excluded from physicians' mental models of core responsibility, and thus not always framed as being "left undone". This cross-cutting meta-theme underscores the importance of understanding care left undone not only as a function of workload or time scarcity, but also as a reflection of professional norms and identity. It suggests that effective responses to care left undone must account for these symbolic boundaries and how they shape frontline decision-making. In doing so, this work calls for more context-sensitive and interdisciplinary approaches to addressing unfinished care in practice.

To conclude, these findings can also be situated within political economy perspectives, which position missed care not merely as the by-product of resource constraints but as a structural outcome of broader neoliberal reforms in healthcare. From this standpoint, omissions are linked to systemic changes such as austerity measures, workforce casualization, and productivity-driven governance. These reforms intensify work environments, erode time for comprehensive care, and normalize practices of rationing. Viewed through this lens, the empirical finding that workload is the single most consistent driver of care left undone must be interpreted as more than an organizational shortcoming: it reflects a systemic reorientation of healthcare priorities toward efficiency and cost containment, often at the expense of relational and holistic care.

Bringing this macro-level perspective into dialogue with micro-level accounts enriches the explanatory power of care left undone as a concept and underscores the multi-layered nature of the phenomenon.[12–14]

Together, these contributions advance the field of care left undone by expanding its empirical reach, promoting an integrated cross-professional perspective, and surfacing the normative underpinnings that shape omission behaviour. The findings align with and extend the social ecological model proposed by Jones et al. (2019), which conceptualises care omissions as products of multilevel influences ranging from organisational conditions to individual professional identity.[15] By integrating these layers of analysis, this dissertation provides a robust, context-sensitive framework for understanding care left undone across professional boundaries. The consistency of findings across both quantitative and qualitative methods reinforces their validity. It underscores the relevance of care left undone as a transferable and conceptually rich construct in the context of modern healthcare.

6.4 STRENGTHS AND LIMITATIONS

This PhD study and the research presented in its chapters come with their own strengths and limitations. A key strength of this PhD is its mixed methods design, integrating quantitative survey-based analyses, a scoping review, and two qualitative studies. This pluralistic approach allowed for a more comprehensive and nuanced understanding of care left undone among physicians, capturing both patterns and underlying mechanisms across methodological lenses. The integration of findings across methods enabled triangulation, increased interpretive depth, and enhanced the study's ecological validity.

Another strength is the comparative scope of the dissertation. By including both physicians and nurses in the multilevel latent class analysis (MLCA), the research transcends a single-profession perspective. This approach enables cross-professional comparisons of job profiles and related experiences of care left undone, offering unique interdisciplinary insights that are rarely addressed in the existing literature. The use of cross-national survey data further strengthens the generalizability of the findings. Drawing from multiple European countries ensures that the observed patterns are not contextually isolated but instead reflect broader structural features of hospital-based care delivery. From a methodological standpoint, the application of MLCA adds further rigor. These techniques enabled the empirical identification of job profiles that were meaningfully associated with care quality outcomes. This approach advances workforce research by moving beyond single-variable associations and offering person-centred classifications grounded in real-world complexity.

Finally, although the instrument developed to measure physician care left undone had not undergone formal pre-validation, its application revealed a theoretically consistent two-factor structure and demonstrated associations with known outcomes such as burnout and intention to leave. These findings provide preliminary evidence of the tool’s construct and criterion-related validity, underscoring its potential utility in future research and practice.

Study-specific limitations have been addressed and discussed within each of the chapters. However, one of these limitations does prompt additional reflection as it is central throughout multiple chapters. The instrument used to measure and capture care left undone among physicians, used in the studies presented in Chapters 2 and 3 is a novel investigator-developed instrument. It is conceptually based on and derived from the Tasks Undone scale.[16] Using expert opinion 11 items were developed and adapted to the context of physicians capturing both clinical elements of care, communication, training and administrative elements related to care. While the instrument is novel, it builds upon a substantial body of research in nursing – spanning over two decades - with instruments that have established strong predictive validity when used in various inpatient specialties.[1,17–19] While the latter argument supports the use of this novel instrument, some limitations need to be addressed.

First, only limited psychometric validation was conducted to establish the instrument's robustness and utility before it was used in Chapter 2. Expert opinion was used to try to reach both content and face validity; however, this was not systematically and empirically supported. While construct and criterion-related validity were not tested previously, several post hoc analyses provide initial support for its construct and criterion-related validity. First, exploratory factor analysis (EFA) (Chapter 3) revealed a two-factor structure that closely mirrors established dimensions in the nursing literature, i.e. one factor representing clinical activities and one factor representing planning and communication activities. This suggests that the conceptual structure of the novel instrument may generalize to the physician context. Second, observed associations between care left undone and key workforce outcomes - such as burnout and intention to leave - align with findings consistently reported in nursing studies. These converging patterns lend empirical support to the theoretical relevance and practical utility of the instrument, indicating its potential to capture meaningful variation in physicians' experiences of unfinished care. Nevertheless, further prospective validation is warranted to confirm these findings and establish the instrument's broader psychometric robustness. Second, the instrument is a self-reported outcome assessment of care left undone and therefore prone to recall bias and social desirability bias. The risk of recall bias is low due to the recall period being very short (i.e. their most recent shift). Given the sensitive nature of the content and the fact that some physicians might find it controlling or conscientiously difficult to indicate which activities were left undone, while in fact they were expected to be performed, there might be a risk of providing socially desirable answers. In spite the potential bias induced by using a self-reported instrument, this method of self-reporting is predominantly used to evaluate care left undone and has demonstrated good validity in nursing research. Although direct observations of care left undone potentially provide a more accurate reflection of care left undone, they are labour-intensive and prone to other types of bias (e.g. Hawthorne effect).

A specific yet noteworthy limitation in Chapter 5 pertains to the sample used. The sample was restricted to one academic teaching hospital where all participating physicians were employed staff members, operating under employment models that may differ from self-employed or mixed practice settings found in other countries. As such, the findings may not fully capture variations that exist across healthcare systems, institutional cultures, or contractual work arrangements. Moreover, the single-institution design limits generalizability across different organizational and cultural contexts.

Lastly, while the scoping review allowed for a broad and comprehensive mapping of this fragmented field, several methodological limitations should be acknowledged. Unlike systematic reviews, the scoping review approach does not include a formal assessment of study quality or risk of bias, and no meta-analytic synthesis was feasible due to heterogeneity in study designs, definitions, and outcome measures. Moreover, given the limited empirical base in this emerging area, the review necessarily included studies with diverse

methodologies and varying degrees of rigor. As such, the conclusions primarily and merely reflect patterns in available research.

6.5 AVENUES FOR FUTURE RESEARCH

This PhD thesis provides some of the first empirical insights into care left undone among physicians, while at the same time it also raises as many questions as it answers. Building on these insights, several avenues for future research emerge.

6.5.1 Developing Valid and Reliable Measures

A central priority for future research is the development and validation of physician-specific instruments to measure care left undone in a standardized, reliable manner across clinical contexts. While validated tools exist for nursing, directly applying these instruments to physicians' risks overlooking profession-specific differences in task structure, role autonomy, and prioritization logic. Developing valid measures for physicians is particularly challenging due to two key factors.

The first concerns the temporal complexity of physicians' work. Clinical tasks for physicians often span multiple timepoints, extend across shifts, or are intentionally deferred as part of diagnostic reasoning, monitoring, or staged clinical decision-making. Unlike nursing care, which often follows a more structured and time-bound workflow, much of physicians' work unfolds in non-linear, asynchronous patterns. Defining when a care activity is "left undone" is therefore less clear-cut, as many actions remain open-ended or are intentionally postponed based on evolving clinical information. The absence of a clear timeframe complicates the identification of whether, when, and to what extent care omissions have actually occurred.

Second, the heterogeneity of physicians' roles presents a further measurement challenge. Physicians' responsibilities vary widely between specialties, career stages, care settings, and even individual practice styles. Their work encompasses not only direct patient care but also diagnostic reasoning, care coordination, administrative obligations, research, teaching, and organizational leadership. This diversity makes it challenging to construct a universally applicable set of care tasks against which omissions can be systematically measured and compared. Standardizing care left undone across such diverse clinical realities will require flexible, context-sensitive instruments that allow for specialty-specific adaptations while preserving core measurement validity.

6.5.2 Tracing Causal Pathways and Interventions

Beyond measurement challenges, several other research priorities emerge. Longitudinal studies are needed to explore the causal pathways linking job demands and resources, care left undone, burnout, and patient safety outcomes over time. Interventional research targeting job redesign, workload optimization, and interdisciplinary teamwork could help assess which organizational strategies most effectively reduce care omissions and improve both clinician well-being and patient outcomes. Finally, comparative research across different professional groups remains critical to building a unified, cross-professional theoretical framework

of unfinished care that fully reflects the complex, interdependent nature of modern healthcare delivery systems.

6.5.3 Addressing the Normative Dimension

Importantly, future research must also grapple with the normative dimension of care left undone among physicians. The qualitative findings from this dissertation suggest that omissions are often rationalised as a form of adaptive prioritisation. While such reasoning reflects the realities of constrained work environments, it raises a critical question: should these omissions be accepted as benign, or do they represent a systematic erosion of what patients can reasonably expect from medical care? Future studies should therefore not only describe prevalence and patterns but explicitly interrogate the acceptability and consequences of physician care left undone, distinguishing between omissions that are clinically justified and those that compromise quality or safety.

6.5.4 Emerging perspectives

In addition to these established priorities, several emerging avenues for research deserve attention. First, the patient perspective on care left undone by physicians is almost entirely absent. Research should integrate patient-reported measures to capture how omissions are perceived, whether they are noticed, and what impact they have on trust, satisfaction, and outcomes. Second, there is a need for cross-cultural and health system comparisons extending beyond European contexts, examining how differing regulatory environments, funding models, and care delivery logics shape patterns of unfinished care. Third, the role of digitalisation and new technologies warrants investigation. Electronic health records, artificial intelligence, and decision support tools may reduce certain omissions but simultaneously introduce new forms of “digital” care left undone. Fourth, more attention should be directed to the intersection of professional identity and interprofessional dynamics, for instance by testing whether identity-shaping interventions or interprofessional education alter what physicians consider dispensable. Finally, there is a need for policy translation and implementation research, investigating how care left undone can be monitored, reported, and sustainably addressed within quality improvement systems.

6.5.5 Towards a Multilevel Agenda

Taken together, these directions highlight the need for a broad, multi-level research agenda. Progress in this field will depend on: (1) developing robust, context-sensitive measurement tools, (2) tracing causal mechanisms longitudinally, (3) interrogating the normative acceptability of omissions, (4) integrating patient and cross-cultural perspectives, (5) addressing the role of technology and professional identity, (6) and embedding unfinished care within organizational quality improvement systems. By advancing simultaneously across these fronts, research can move from descriptive accounts of care left undone toward actionable

solutions that safeguard physician well-being, strengthen professional integrity, and ultimately enhance patient safety and trust in healthcare.

6.6 IMPLICATIONS FOR POLICY AND PRACTICE

The findings of this PhD-thesis carry several important implications for healthcare policy and clinical practice. Fundamentally, they demonstrate that care left undone is not confined to nursing but is also prevalent among physicians. Recognizing the cross-professional nature of unfinished care is vital for policymakers, hospital administrators, and professional organisations, as it broadens the perspective from a nursing-specific issue to one that pervades the entire clinical workforce. This recognition calls for unified, cross-professional solutions and shared accountability in tackling care omissions, as well as aligned quality improvement efforts.

6.6.1 Organisational Implications: Addressing Structural Blind Spots

At the organisational level, the consistent pattern whereby physicians deprioritise psychosocial care, communication, and documentation highlights a structural blind spot in how medical work is organised and valued. Evidence suggests that when emotional and relational care activities are left undone, patient outcomes can be negatively affected, including increased risk of patient harm, lower satisfaction, longer lengths of stay, and even higher mortality. If healthcare systems continue to tacitly accept that these dimensions of care are expendable, they risk institutionalising a two-tiered definition of medical work: one where technical, biomedical tasks are safeguarded and relational and integrative aspects are systematically underprovided. Hospital leaders should therefore resist viewing physician care left undone merely as "adaptive prioritisation." Instead, care omissions must be understood as signals of systemic strain that warrant structural interventions.

6.6.2 Targeted Organisational Interventions

Organisational responses should move beyond generic increases in staffing. Efforts must specifically target the types of care most at risk of omission. Interventions could include workflow redesign, integration of interprofessional teamwork, and development of institutional incentives for relational and psychosocial care. Protecting time for communication, patient education, and thorough documentation is not peripheral, but central to safe, patient-centred medicine. For example, evidence from hospital-based interventions indicates that organizational redesigns can improve care quality and clinician well-being by structurally supporting nursing and medical staff. Digital solutions, such as smart monitoring systems, also show potential in identifying and addressing gaps in care delivery.

6.6.3 Policy-Level Implications: Professional Identity and Role Boundaries

At the policy level, a re-examination of professional identity and role boundaries is critical. Qualitative findings from this and other studies reveal the powerful influence of professional norms in shaping what is considered "core" work for physicians, frequently privileging urgent biomedical interventions at the expense of integrative, psychosocial, or communicative care. Policy initiatives - including updated competency

frameworks, revised accreditation standards, and requirements for continuing professional development - should explicitly challenge these norms and expand the accepted scope of physician responsibility to include relational and psychosocial care. Without such reorientation, there is a risk that policies will continue to reinforce outdated professional hierarchies, which in turn normalise omissions.

6.6.4 Systems-Level Approaches: Learning Cycles and Quality Improvement

On a systems level, applying experiential learning principles can embed the monitoring and addressing of unfinished care into continuous quality improvement processes. Healthcare organisations could treat reports of care left undone not merely as performance deficiencies but as indicators and drivers for reflection, redesign, and evaluation. Iterative cycles of monitoring, reflection, operational change, and re-assessment can help institutions systematically uncover and remedy the root causes of omissions, whether in workload, workflow, digital infrastructure, or professional culture.

6.6.5 Normative and Ethical Considerations

Finally, the policy debate must grapple with the normative implications of physician care left undone. The findings, congruent with other research, indicate that physicians frequently rationalise omissions as a form of necessary triage under constrained circumstances. Policymakers, however, must ask whether chronic normalisation of such omissions is acceptable—especially when they involve psychosocial, relational, or administrative dimensions essential to trustworthy and holistic medical care. Allowing these aspects to consistently “fall through the cracks” risks undermining both patient trust and the broader sustainability of medical professionalism.

6.6.6 Evidence Based Recommendations

In light of the above, the following evidence-based recommendations emerge: (1) Invest in structural supports, including optimized staffing, workflow redesign, and digital monitoring, to reduce the risk of care left undone. (2) Embed the monitoring and analysis of unfinished care, including its emotional and relational dimensions, in quality improvement cycles. (3) Revise policies, training, and competency standards to broaden the recognised domain of physician responsibility beyond technical tasks. (4) Foster a healthcare culture where omissions are viewed as signals for learning and adaptation, not just individual coping or professional failure.

6.7 CONCLUSION

This PhD study set out to examine care left undone among physicians - a phenomenon long acknowledged in nursing research but scarcely explored in the medical profession. Anchored in a realist paradigm and using a mixed methods design, this dissertation examined the prevalence, predictors, and lived experiences of care left undone across multiple empirical and conceptual domains. By combining survey-based analyses, a scoping review, and qualitative inquiry, it provided a multi-faceted examination of how physicians navigate the tension between professional expectations and organisational constraints.

The findings of this PhD project demonstrate that care left undone is not confined to nursing practice but is a widespread, systemic issue that also affects physicians working in acute hospital settings. The omission of care was found to be highly prevalent, shaped predominantly by excessive workload and the competing demands physicians face within complex clinical environments. Importantly, the patterns and consequences of care left undone among physicians mirror those reported in nursing literature, lending support to the conceptual transferability of this construct across professional boundaries. Physicians working under high-strain job conditions—characterised by elevated demands and limited resources—were more likely to leave care undone and to report emotional exhaustion, job dissatisfaction, and perceptions of compromised patient safety.

This work advances the field in three substantive ways. First, it extends the empirical foundation of care left undone to physicians, demonstrating that core mechanisms identified in nursing research—such as the influence of workload, resource constraints, and task prioritisation—also shape physician behaviour. Second, by adopting a joint analytical perspective, this research brings to light how nurses and physicians are embedded within shared institutional environments that shape their care practices in similar ways. This systems-level lens challenges the siloed approach often taken in workforce research and enables a more integrated understanding of how organisational conditions contribute to incomplete care. Third, it introduces a critical conceptual dimension by showing that care left undone is also a function of professional identity. The qualitative findings revealed that what physicians consider as “core” or “peripheral” tasks is influenced not only by time scarcity but by symbolic role boundaries, which govern what is recognised as legitimate professional responsibility.

Beyond these contributions, this work offers methodological innovations by applying multilevel latent class analysis to explore occupational profiles and by developing a novel instrument to assess care left undone among physicians. While further validation is warranted, this tool provides a first step toward addressing the absence of profession-specific measurement instruments in this domain. Additionally, the integration of theoretical models such as the Job Demands-Resources framework and the Social Ecological Model enabled

a nuanced interpretation of how care omissions are shaped by interactions across individual, team, organisational, and systemic levels.

Taken together, these insights have important implications for policy and practice. They underscore the need to move beyond individual-level interventions and instead target the structural and cultural conditions that give rise to omission behaviour. Strategies such as workload redistribution, administrative streamlining, and support for ethical prioritisation should be tailored to professional contexts and organisational realities. At the same time, fostering reflective dialogue around care priorities and professional role expectations may mitigate the moral distress experienced when care cannot be delivered as intended.

In conclusion, this PhD-study contributes to a growing body of work that reframes care left undone not as a personal failing but as a systemic outcome of contemporary healthcare delivery. It highlights that understanding and addressing incomplete care requires both empirical sensitivity and conceptual depth—recognising that what is left undone is shaped not only by how much time is available, but by who we expect to do what, and why. In a healthcare landscape increasingly marked by complexity, scarcity, and fragmentation, addressing care left undone must become a central concern for those committed to safe, sustainable, and person-centred care.

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LIST OF PUBLICATIONS

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ACKNOWLEDGEMEBTS, PERSONAL CONTRIBUTIONS, CONFLICT OF INTEREST STATEMENTS AND USE OF GENERATIVE AI

ACKNOWLEDGEMENTS

Overall: We wish to thank the editors and reviewers of the scientific journals that published our results for their valuable feedback, which has contributed greatly to the quality of the included articles.

Chapter 4: We would like to thank Dorothea Kohnen for her independent critical appraisal of all included studies in this scoping review. We would also like to thank the librarians from the KU Leuven library "2Bergen" for their technical advice in developing and optimizing the search strategy included in this scoping review.

Chapter 5: We would like to thank all physicians who participated in the semi-structured interviews and were willing to share their experiences in relation to care left undone.

PERSONAL CONTRIBUTIONS

Chapter 2: Simon Dello (SD) and Dorothea Kohnen (DK) performed the data collection. SD performed the primary data analysis and writing, under supervision of Luk Bruyneel (LB), Hans de Witte (HDW), Wilmar B. Schaufeli (WBS) and Walter Sermeus (WS).

Chapter 3: SD and DK performed the data collection. SD performed the primary data analysis and writing, under supervision of LB, HDW, WBS and WS.

Chapter 4: SD, Ken De Smet (KDS) and WS were responsible for the conceptualisation and methodology of the study. SD and KDS jointly developed the search strategy , performed the literature search (data curation), formal thematic analysis and critical appraisal of the included studies. SD and KDS both contributed significantly to the writing of the original draft and revisions.

Chapter 5: SD, KDS and WS were responsible for the conceptualisation and methodology of the study. SD and KDS jointly performed the semi-structured interviews and formal thematic analysis. SD and KDS both contributed significantly to the writing of the original draft and revisions.

CONFLICT OF INTEREST

The author declares no conflict of interest.

USE OF GENERATIVE AI

I did use the generative AI assistance tools Chat GPT and Perplexity. Both Chat GPT and Perplexity were used to help with improving flow and readability of Chapter 1 (Introduction) and Chapter 6 (Discussion). The text/code/ images in this thesis are my own (unless otherwise specified) and generative AI has only been used in accordance with the KU Leuven guidelines and appropriate references have been added. I have reviewed and edited the content as needed and I take full responsibility for the content of the thesis.

DANKWOORD