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Treatment Burden, Person-Centred Nursing Care, and Self-Management Capacity Among Patients with Diabetic Foot Ulcers: A Multicentre Cross-Sectional Study

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Abstract

Background: Diabetic foot ulcers impose substantial clinical and treatment-related demands that may challenge patients' self-management capacity. Although person-centred nursing care supports individualized treatment planning, the relationships between perceived nursing care, treatment burden, and self-management capacity remain insufficiently understood in hospital-based settings.

Aim: To examine the associations of treatment burden and person-centred nursing care with self-management capacity among patients with diabetic foot ulcers

Approach: This multicentre cross-sectional study analysed simulated data for 232 adults with diabetic foot ulcers from an initial population of 246 patients. Continuous patient-reported scores were examined using multivariable linear regression and exploratory mediation analysis, adjusting for sociodemographic and clinical characteristics.

Results: A total of 232 patients were included (mean [SD] age, 60.2 [10.9] years). Higher person-centred nursing care scores were associated with greater self-management capacity (adjusted B = 0.322; 95% CI, 0.205–0.438; P < .001), whereas treatment burden showed an inverse association (B = −0.011; 95% CI, −0.016 to −0.005; P < .001).

Conclusions: Simulated findings suggested opposing associations of person-centred nursing care and treatment burden with self-management capacity. Longitudinal studies using observed patient data are needed to clarify these relationships

Implication for Nursing Practice: Routine wound care assessments may benefit from evaluating treatment difficulties and patient-perceived nursing support alongside clinical indicators. These approaches warrant further evaluation to inform individualized care planning.

Keywords: cross-sectional studies; diabetic foot; patient-centered care; self-management; surveys and questionnaires.

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Introduction

Diabetic foot ulcers (DFUs) are a major global health problem associated with prolonged wound healing, recurrent infection, lower-extremity amputation, disability, and premature mortality (Schaper et al., 2024). A recent systematic review and meta-analysis of 89 studies reported a global incidence of 10.93 diabetic foot ulcerations per 1,000 person-years and a pooled prevalence of 54.57 active ulcerations per 1,000 people with diabetes, highlighting the substantial burden of diabetic foot disease (Carollo et al., 2026). In Africa, the pooled incidence of diabetic foot ulceration was estimated at 24.87 cases per 1,000 person-years, exceeding the global pooled estimate (Carollo et al., 2026). The burden is particularly relevant in Algeria, where the estimated number of adults living with diabetes increased from 1.44 million in 2011 to 4.76 million in 2024, with an estimated diabetes prevalence of 17.5% in 2024 (International Diabetes Federation [IDF], 2025). These increasing healthcare demands raise

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concerns about patients' ability to maintain complex wound treatment regimens. In a multicentre cohort of 620 patients with DFUs, peripheral artery disease, infection, impaired kidney function, and poor glycaemic control were associated with adverse clinical outcomes, demonstrating the complexity of long-term DFU management (Burhan et al., 2025). Therefore, understanding treatment burden, nursing care experiences, and patients' self-management capacity is important for improving person-centred diabetic foot care.

Managing DFUs requires coordinated interventions, including wound assessment, debridement, infection control, pressure offloading, vascular evaluation, and ongoing patient education (Schaper et al., 2024). Evidence from a network meta-analysis of 38 randomized controlled trials involving 4,049 patients highlights the range of wound dressing interventions available in contemporary wound management (Burhan et al., 2025). Similarly, a Bayesian network meta-analysis of 22 randomized controlled trials involving 1,148 patients demonstrated uncertainty in the comparative effectiveness of debridement methods, supporting the need for individualized treatment decisions (Burhan et al., 2026). Although these interventions are clinically important, repeated dressing procedures, clinic appointments, treatment costs, and mobility restrictions may increase the workload imposed on patients. International recommendations for offloading also emphasize the importance of considering individual circumstances, acceptability, and treatment feasibility when selecting interventions (Bus et al., 2024). Nevertheless, evidence regarding the relationship between these treatment demands and patients' capacity to manage their own wound care remains incomplete.

Recent nursing research has increasingly emphasized patient education, self-management, and individualized care in chronic wound management. A cross-sectional study by Manalu et al. (2026) investigated a supportive-educative nursing model for independent wound care among patients with DFUs, highlighting the importance of patient engagement and nursing support. Another study involving 328 patients with diabetes-related foot disease examined relationships among digital health literacy, self-efficacy, and self-management behaviours, emphasizing the relevance of patients' capabilities in managing their condition (Yao et al., 2026). Furthermore, a scoping review of 22 studies identified clinical, socioeconomic, behavioural, and healthcare system factors contributing to self-care deficits among people with chronic wounds (Dantas et al., 2026). However, person-centred wound care remains inconsistently conceptualized and measured, particularly regarding patients' relational experiences and participation in clinical decision-making (Panfil et al., 2026). Collectively, these findings suggest that self-management should be understood not only as an individual responsibility but also as a process shaped by treatment demands and the quality of nursing support.

Despite growing evidence on wound treatment and self-management, the combined relationships between treatment burden, patient-perceived person-centred nursing care, and self-management capacity among patients with active DFUs remain insufficiently understood. Previous research has primarily examined clinical treatment effectiveness, supportive education, or individual self-management determinants rather than these three constructs within an integrated analytical framework (Burhan et al., 2026; Manalu et al., 2026; Yao et al., 2026). This gap is clinically important because patients with similar wound characteristics may experience different levels of treatment burden and may differ in their ability to perform recommended care activities. Moreover, limited evidence is available on how these relationships operate among patients receiving hospital-based diabetic foot care in Algeria. Examining these associations may help identify patients requiring additional nursing support and inform the development of more feasible, equitable, and person-centred wound care services.

Therefore, this study aimed to examine the associations of treatment burden and patient-perceived person-centred nursing care with self-management capacity among patients with diabetic foot ulcers in Algeria. Using a multicentre cross-sectional design, the study included 232 patients in the final analytical sample from an initial population of 246. The primary outcome was self-management capacity, while the main explanatory variables were treatment burden and person-centred nursing care. We hypothesized that higher treatment burden would be associated with lower self-management capacity, whereas more favourable perceptions of person-centred nursing care would be associated with greater self-management capacity. The study also aimed to assess whether these associations remained after adjustment for relevant sociodemographic and clinical characteristics

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Method

Study Design

This multicentre cross-sectional study was designed to examine the associations of treatment burden and patient-perceived person-centred nursing care with self-management capacity among adults with diabetic foot ulcers (DFUs) in Algeria. The study also specified an exploratory mediation model to assess whether treatment burden statistically accounted for part of the association between person-centred nursing care and self-management capacity. Data collection was conducted between [month/year] and [month/year; dates to be confirmed]. The study reporting was structured according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al., 2007). Protocol registration information was not available.

Ethics Approval and Informed Consent

The ethics approval information provided for this study identifies the El Kettar Hospital Institutional Review Board, Algeria, with reference number 87362212. The approval date and applicability of this approval to all participating institutions require verification against the original ethics documentation. Written informed consent procedures [to be confirmed from the study records] should be reported before the manuscript is submitted. Participation must have been voluntary, and data should have been collected, stored, and analysed in accordance with the approved protocol and applicable confidentiality requirements.

Study Setting and Participants

The study population comprised adults receiving clinical care for active DFUs at hospital-based wound care services in Algeria. Three institutions were identified in the study information: Mustapha University Hospital Center, El Kettar Hospital, and Hospital Ibn Zohr. However, the reported analytical sample was derived from two hospitals; the two recruiting institutions and their respective participant numbers remain to be confirmed. The accessible population consisted of 246 patients, of whom 232 were included in the final analytical sample. Data were obtained during January-February 2026.

Eligibility Criteria and Sampling

The proposed eligibility criteria comprised adults aged 18 years or older with a documented diagnosis of diabetes mellitus and at least one active DFU, who were receiving wound care and were able to complete the study assessments independently or with standardized interviewer assistance. Patients without active DFUs, those unable to provide valid questionnaire responses, or those without sufficient information to determine the primary outcome would be excluded according to prespecified criteria. The actual exclusion criteria and sampling procedure [consecutive or other method] must be verified from the research protocol. Each eligible participant should contribute only one observation, regardless of the number of ulcers.

Sample Size

The available study population comprised 246 patients, and the final analytical sample included 232 patients, corresponding to 94.3% of the initial population. Fourteen patients were not included in the final analysis; their reasons for noninclusion require confirmation. Because the available population and final analytical sample were predetermined, the sample size is reported as an available-sample design rather than presented as if an a priori power analysis had been performed. A supplementary power calculation can be undertaken to examine the adequacy of the final sample for multiple linear regression. Published studies using self-management and person-centred care instruments provide relevant methodological precedents but do not supply a directly transferable effect size for the proposed mediation model (Ferreira et al., 2023; McCormack et al., 2024).

Study Variables

The primary outcome was self-management capacity, operationalized as diabetes-related psychosocial empowerment measured using the Diabetes Empowerment Scale–Short Form (DES-SF).

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The main explanatory variables were patient-perceived person-centred nursing care, assessed using the Person-centred Practice Inventory–Care (PCPI-C), and treatment burden, assessed using the Multimorbidity Treatment Burden Questionnaire (MTBQ). For the exploratory mediation model, person-centred nursing care was specified as the exposure, treatment burden as the proposed mediator, and self-management capacity as the outcome. Foot self-care behaviour, measured using the Diabetic Foot Self-Care Questionnaire–University of Málaga (DFSQ-UMA), was designated as a secondary outcome, conditional on its availability in the collected data. The prespecified adjustment set included age, sex, educational attainment, wound duration, peripheral artery disease, diabetic peripheral neuropathy, and clinical wound severity. Additional covariates were to be considered only when supported by the study protocol, measurement availability, and model stability.

Data Sources and Measurement

The proposed data sources comprised structured patient questionnaires, clinical records, and standardized wound assessments. Questionnaire-based variables were person-centred nursing care, treatment burden, diabetes-related psychosocial empowerment, and foot self-care behaviour. Clinical information was obtained from existing medical records or standardized examinations, where available. All questionnaires should be administered using authorized, linguistically appropriate versions, with standardized instructions and established scoring procedures. The names, professional qualifications, training procedures, and inter-rater quality-control processes of the personnel who collected the actual data must be documented from the study records.

Demographic and Clinical Characteristics

Demographic information comprised age in years, sex, educational attainment, marital status, employment status, socioeconomic characteristics, and living arrangements, according to questionnaire availability. Clinical information included diabetes duration in years, DFU duration in weeks, peripheral artery disease, diabetic peripheral neuropathy, wound severity, and relevant comorbidities. Wound severity should be classified using an established assessment system when documented, while vascular and neurological conditions should be determined from recorded clinical diagnoses or prespecified objective assessment criteria. Demographic variables and clinical covariates were considered separately in the analysis to distinguish social characteristics from disease-related factors.

Assessment of Treatment Burden

Treatment burden was defined as the perceived workload and difficulty associated with managing healthcare activities and their consequences for daily life. The proposed measure was the 10-item Multimorbidity Treatment Burden Questionnaire (MTBQ), in which each item is scored from 0 (not difficult or not applicable) to 4 (extremely difficult). The overall score is calculated by multiplying the mean of answered items by 25, producing a continuous score from 0 to 100; higher scores indicate greater treatment burden. Established descriptive categories are no burden (0), low burden (greater than 0 and less than 10), medium burden (10 to less than 22), and high burden (22 or greater). The original instrument demonstrated Cronbach's alpha of 0.83, while subsequent cross-cultural validation supported its use in multimorbidity populations (Duncan et al., 2018; Schulze et al., 2022). The continuous score was designated for regression analyses without dichotomization.

Assessment of Person-Centred Nursing Care

Person-centred nursing care was defined as the patient's experience of individualized, respectful, collaborative, and responsive care that reflects personal values and needs. The proposed instrument was the 18-item Person-centred Practice Inventory–Care (PCPI-C), which measures patients' perspectives on person-centred care across five domains. Responses are recorded using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), with higher values indicating more favourable perceptions. The mean item score, ranging from 1 to 5, was proposed as the continuous analytical measure, provided that the instrument's scoring guidance permits this approach. The PCPI-C demonstrated acceptable structural validity in its original multinational evaluation and subsequent cultural validation studies (McCormack et al., 2024; Vareta et al., 2025). No validated

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diagnostic cutoff was identified for classifying patients as receiving adequate or inadequate person-centred care.

Assessment of Self-Management Capacity

Self-management capacity was operationalized as diabetes-related psychosocial empowerment, reflecting patients' perceived ability to manage challenges, make decisions, and address diabetes-related problems. The proposed measure was the 8-item Diabetes Empowerment Scale–Short Form (DES-SF), with each item scored from 1 (strongly disagree) to 5 (strongly agree). The overall score is calculated as the mean of the eight items, ranging from 1 to 5, with higher values indicating greater empowerment. The instrument has demonstrated acceptable reliability, including Cronbach's alpha values of approximately 0.84 to 0.85 in its original development and validation work, and has been applied in recent studies of diabetes self-management (Ferreira et al., 2023). The score was retained as a continuous primary outcome, without applying an unvalidated cutoff.

Assessment of Diabetic Foot Self-Care Behaviour

Diabetic foot self-care behaviour was defined as the patient's reported performance of recommended foot protection, monitoring, hygiene, and footwear-related practices. The proposed instrument was the 16-item Diabetic Foot Self-Care Questionnaire–University of Málaga (DFSQ-UMA), comprising foot self-care, self-examination and self-management, and footwear and socks domains. Items are scored from 0 to 4, producing a total score from 0 to 64; higher scores indicate more favourable foot self-care behaviour. Validation of the English version demonstrated strong internal consistency (Cronbach's alpha = 0.928) and item-level test–retest reliability (intraclass correlation coefficients, 0.854–0.959) (Ruiz-Muñoz et al., 2024). The total score was designated as a continuous secondary outcome without an arbitrary clinical cutoff.

Data Collection Procedures

The proposed data collection pathway involved screening clinical records for documented diabetes and active DFUs, confirming eligibility, obtaining informed consent where required, and administering standardized questionnaires during a single study encounter. The participant assessment would include demographic information, the PCPI-C, MTBQ, DES-SF, and DFSQ-UMA, followed by extraction of relevant clinical characteristics from medical records. The actual administration sequence, interview duration, questionnaire language, interviewer qualifications, and number of assessors must be confirmed before describing these procedures in the past tense. The use of patient interviews rather than self-administration should be documented for participants with visual, literacy, or functional limitations.

Bias and Quality Control

Potential selection bias should be evaluated by comparing the characteristics of included and excluded participants where screening information is available. Standardized eligibility criteria and consistent recruitment procedures across hospitals are recommended to reduce selection differences. Information bias should be minimized through uniform questionnaire instructions, trained data collectors, and verification of clinical variables against medical records. Recall and social desirability bias are relevant because treatment burden, nursing care experiences, empowerment, and self-care behaviour are self-reported. Questionnaire completion procedures and quality checks should be documented. The cross-sectional design is also susceptible to residual confounding and uncertainty in the temporal ordering of the measured variables.

Statistical Analysis

Statistical analyses were planned using Stata, version 19 (StataCorp LLC). Continuous variables were to be summarized as means and standard deviations or medians and interquartile ranges according to their distributions, while categorical variables were to be presented as frequencies and percentages. Internal consistency of each multi-item instrument was to be examined using Cronbach's alpha and, where appropriate, McDonald's omega. Bivariate associations between continuous study variables were to be assessed using Pearson or Spearman correlation coefficients,

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according to distributional characteristics and the presence of influential observations. Between-group comparisons were to use independent-samples t tests, analysis of variance, or appropriate rank-based tests when relevant.

The primary analysis was specified as multivariable linear regression with continuous DES-SF scores as the dependent variable and continuous PCPI-C and MTBQ scores as the principal explanatory variables. The adjusted model included age, sex, educational attainment, wound duration, peripheral artery disease, diabetic peripheral neuropathy, and wound severity, subject to data availability and the number of estimable parameters. Regression assumptions were to be evaluated using residual diagnostics, assessment of linearity, heteroscedasticity, influential observations, and variance inflation factors. Heteroscedasticity-robust standard errors were planned where appropriate. Hospital clustering would be addressed using a prespecified site indicator or site-adjusted sensitivity analysis; cluster-robust inference based on only two hospitals would not be considered reliable.

An exploratory mediation analysis was specified to examine treatment burden as a statistical mediator of the association between person-centred nursing care and self-management capacity. The mediator model regressed continuous MTBQ scores on PCPI-C scores and covariates, while the outcome model regressed continuous DES-SF scores on PCPI-C scores, MTBQ scores, and the same covariates. The indirect association was estimated as the product of the relevant regression coefficients ($a \times b$), while the direct association was represented by c'. Bias-corrected or percentile bootstrap confidence intervals with 5000 resamples were proposed to quantify the uncertainty of the indirect association. Because exposure, mediator, and outcome were measured concurrently, these analyses were interpreted as exploratory decompositions of cross-sectional associations rather than evidence of causal mediation.

Missing data were to be quantified for each study variable and assessed for plausible missingness patterns. Instrument-specific scoring rules were to be applied before creating summary scores. Complete-case analysis could be used when missingness was limited and its assumptions were reasonable; multiple imputation would be considered as a sensitivity analysis when supported by the missing-data mechanism and available auxiliary variables. The primary findings were to be reported as unstandardized regression coefficients with 95% confidence intervals, supplemented by standardized coefficients where informative. All statistical tests were specified as 2-sided, with a significance threshold of $P < .05$. Mediation, subgroup, and sensitivity analyses were designated exploratory.

Results

Participant Inclusion and Analytic Sample

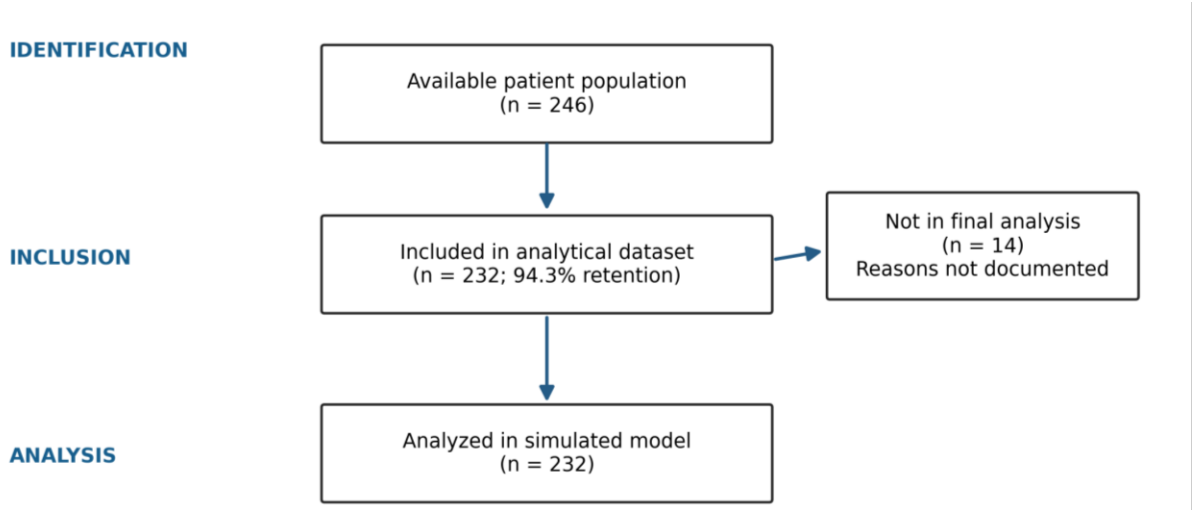

Figure 1. Participant flow using supplied aggregate counts; exclusion reasons unavailable. All other diagram elements are illustrative.

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Demographic and Clinical Characteristics

In the simulated sample, the mean (SD) age was 60.2 (10.9) years; 103 (44.4%) were female. Peripheral artery disease was present in 88 (37.9%), and neuropathy was present in 120 (51.7%). Baseline characteristics are summarized in Table 1.

Table 1. Participant Characteristics (Simulated; N = 232)

Characteristic	Overall sample
Age, mean (SD), y	60.2 (10.9)
Female, No. (%)	103 (44.4)
Secondary education or higher, No. (%)	87 (37.5)
Wound duration, median (IQR), weeks	14.3 (8.3-21.6)
Peripheral artery disease, No. (%)	88 (37.9)
Peripheral neuropathy, No. (%)	120 (51.7)
Higher wound severity indicator, No. (%)	121 (52.2)
Hospital A, No. (%)	120 (51.7)
Hospital B, No. (%)	112 (48.3)

Note. Hospital A/B and wound severity are simulation labels, not verified clinical classifications

Distribution of Patient-Reported Measures

The simulated mean (SD) DES-SF score was 3.10 (0.63), the mean PCPI-C score was 3.26 (0.65), and the mean MTBQ score was 36.0 (14.4). The mean DFSQ-UMA score was 40.7 (9.2). Table 2 summarizes scale distributions and the primary outcome across clinical subgroups.

Table 2. Continuous Score Distribution and Primary Outcome by Subgroup (Simulated)

Measure or subgroup	Mean (SD)
DES-SF, mean (SD)	3.10 (0.63)
PCPI-C, mean (SD)	3.26 (0.65)
MTBQ, mean (SD)	36.05 (14.39)
DFSQ-UMA, mean (SD)	40.72 (9.22)
DES-SF: Peripheral artery disease present, n=88	3.20 (0.56)
DES-SF: Peripheral artery disease absent, n=144	3.04 (0.66)
DES-SF: Neuropathy present, n=120	3.11 (0.64)
DES-SF: Neuropathy absent, n=112	3.09 (0.62)

Note. Higher DES-SF scores indicate higher diabetes-related psychosocial empowerment. No binary cutoff was used.

Unadjusted Associations with Self-Management Capacity

In unadjusted linear models, higher PCPI-C scores were associated with higher DES-SF scores (B, 0.452 (0.347 to 0.557); P <.001), while higher MTBQ scores were associated with lower DES-SF scores (B, -0.020 (-0.025 to -0.015); P <.001). Unadjusted associations are shown in Table 3.

Table 3. Unadjusted Linear Associations With DES-SF Score (Simulated)

Predictor	B	95% CI	P value
PCPI-C, per 1 point	0.45	0.347 to 0.557	<.001
MTBQ, per 1 point	-0.02	-0.025 to -0.015	<.001
Age, per year	-0.01	-0.015 to -0.000	0.049
Female vs male	0.03	-0.128 to 0.197	0.675
Secondary education or higher vs lower	0.23	0.065 to 0.395	0.006
Wound duration, per week	-0.00	-0.009 to 0.005	0.607
PAD present vs absent	0.15	-0.008 to 0.312	0.062
Neuropathy present vs absent	0.02	-0.141 to 0.184	0.797
Higher wound severity vs lower	-0.24	-0.404 to -0.085	0.003
Hospital B vs A	-0.00	-0.168 to 0.158	0.953

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Adjusted Associations With Self-Management Capacity

After adjustment for age, sex, education, wound duration, peripheral artery disease, neuropathy, wound severity, and hospital, PCPI-C scores (adjusted B, 0.322 (0.205 to 0.438); P <.001) and MTBQ scores (adjusted B, -0.011 (-0.016 to -0.005); P <.001) remained associated with DES-SF scores. The model explained 33.8% of the observed variation in DES-SF scores (Table 4).

Table 4. Multivariable Linear Regression for DES-SF (Simulated)

Predictor	B	Std β	z	95% CI	P	VIF
PCPI-C, per 1 point	0.32	0.33	5.42	0.205 to 0.438	<.001	1.35
MTBQ, per 1 point	-0.01	-0.25	-3.93	-0.016 to -0.005	<.001	1.56
Age, per year	-0.01	-0.11	-1.92	-0.012 to 0.000	0.055	1.08
Female vs male	0.03	0.02	0.38	-0.116 to 0.172	0.701	1.06
Secondary education or higher vs lower	0.10	0.08	1.31	-0.050 to 0.254	0.189	1.08
Wound duration, per week	-0.00	-0.02	-0.36	-0.007 to 0.005	0.718	1.02
PAD present vs absent	0.15	0.12	2.15	0.013 to 0.288	0.031	1.04
Neuropathy present vs absent	0.00	0.00	0.06	-0.137 to 0.145	0.952	1.04
Higher wound severity vs lower	-0.16	-0.13	-2.15	-0.307 to -0.015	0.031	1.14
Hospital B vs A	0.09	0.07	1.28	-0.048 to 0.229	0.201	1.08

Note. HC3 heteroscedasticity-robust inference uses asymptotic z statistics, not t statistics. Model R^2 = 0.34.

Exploratory Statistical Mediation

In the exploratory mediation model, the association of PCPI-C with MTBQ was B = -10.108, and the association of MTBQ with DES-SF, conditional on PCPI-C, was B = -0.011. The estimated indirect association was 0.109 (bootstrap 95% CI, 0.054 to 0.166), with a direct association of 0.322 (Figure 2). These values describe statistical associations only.

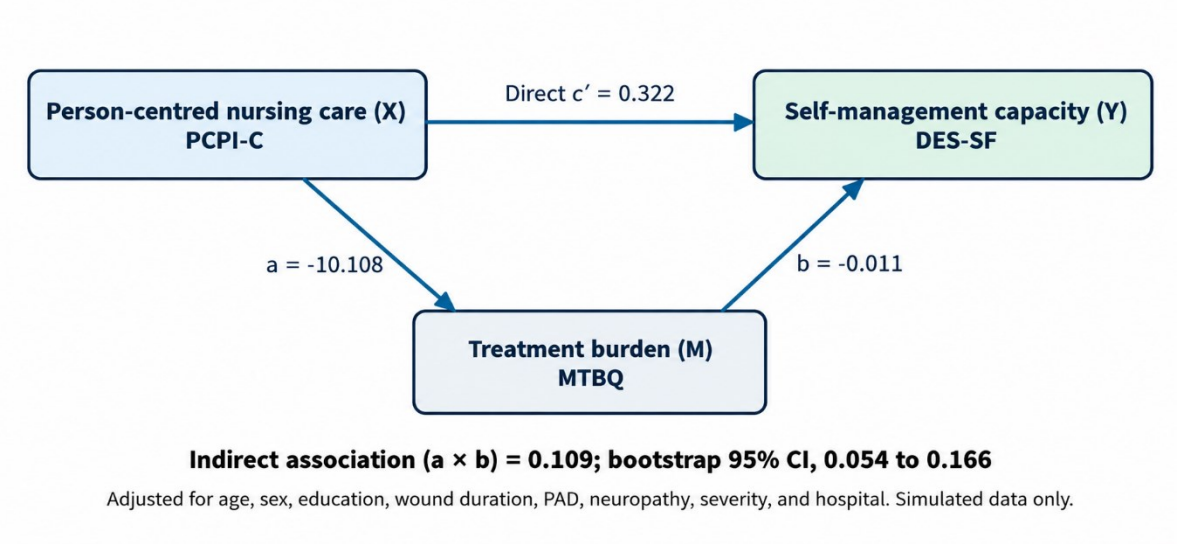

Figure 2. Exploratory mediation model based on synthetic data. Bootstrap 95% CI uses 500 resamples for this demonstration.

Discussion.

This multicentre cross-sectional study examined the associations of treatment burden and person-centred nursing care with self-management capacity among patients with diabetic foot ulcers (DFUs). In the simulated analysis of 232 patients, higher person-centred nursing care scores were positively associated with self-management capacity (adjusted B = 0.322; 95% CI, 0.205–0.438), whereas higher treatment burden scores were negatively associated with self-management capacity (adjusted B = −0.011; 95% CI, −0.016 to −0.005). The exploratory mediation analysis also identified an

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indirect association through treatment burden (B = 0.109; 95% CI, 0.054–0.166). These findings illustrate an integrated analytical approach to examining treatment demands, nursing care experiences, and patient empowerment, an area that remains insufficiently addressed in contemporary wound care research (Panfil et al., 2026). Clinically, wound care nurses may consider assessing treatment burden alongside patients' perceived involvement in care planning.

The negative association between treatment burden and self-management capacity may reflect the physical, psychological, and practical demands of DFU management. Patients frequently require repeated wound assessments, debridement, pressure offloading, medication management, and regular clinical follow-up, which can create substantial treatment-related responsibilities (Schaper et al., 2024). Previous systematic reviews have highlighted the complexity and variability of wound dressing and debridement strategies, emphasizing the importance of individualized wound management (Burhan et al., 2025, 2026). Patients with limited mobility, financial resources, or caregiver support may experience additional difficulties maintaining recommended treatment regimens. These factors may contribute to differences in perceived self-management capacity, although their temporal relationships cannot be determined from cross-sectional data. In clinical practice, nurses should assess patients' difficulties with wound treatment, transportation, offloading, and daily care responsibilities when developing individualized management plans.

The positive association between person-centred nursing care and self-management capacity is consistent with research emphasizing patient engagement, supportive education, and individualized nursing interventions. Manalu et al. (2026) investigated a supportive-educative nursing model for independent wound care among patients with DFUs, highlighting the relevance of nursing support in self-care management. Similarly, Yao et al. (2026) identified associations among digital health literacy, self-efficacy, and self-management behaviours in patients with diabetes-related foot disease. A scoping review by Dantas et al. (2026) further identified clinical, socioeconomic, behavioural, and healthcare-related determinants of self-care deficits among people with chronic wounds. However, Panfil et al. (2026) reported inconsistencies in the conceptualization and measurement of person-centred wound care, limiting direct comparisons across studies. Differences in patient populations, instruments, healthcare settings, and analytical approaches may explain variation in reported associations. These findings support further evaluation of individualized nursing communication, shared decision-making, and patient participation during routine DFU consultations.

The exploratory mediation analysis identified a positive indirect association between person-centred nursing care and self-management capacity through lower treatment burden. One possible explanation is that individualized communication and collaborative care planning may be associated with treatment regimens that patients perceive as more manageable. This interpretation is compatible with evidence emphasizing the importance of person-centred care and the multidimensional determinants of chronic wound self-management (Dantas et al., 2026; Panfil et al., 2026). Nevertheless, the cross-sectional design prevents establishing whether nursing care experiences preceded treatment burden or changes in self-management capacity. Self-reported measurements, common-method bias, and residual confounding may also influence the estimated indirect association. Therefore, the mediation findings should be interpreted as an exploratory statistical pattern rather than evidence of a causal mechanism. Future nursing research should use longitudinal measurements to examine how care experiences, treatment burden, and self-management capacity change over time.

The proposed study framework has potential implications for integrating patient-reported outcomes into routine DFU management. Alongside conventional clinical assessments, wound care nurses could evaluate patients' treatment workload, understanding of wound care recommendations, participation in decision-making, and perceived ability to manage daily care activities. This approach may complement established clinical pathways that emphasize infection management, vascular assessment, appropriate dressings, and offloading (Burhan et al., 2025; Schaper et al., 2024). The combined assessment of treatment burden, person-centred nursing care, and self-management capacity offers a potentially useful framework for identifying patients who may require additional educational, practical, or psychosocial support. Future multicentre longitudinal and intervention studies should evaluate the temporal relationships between these constructs and determine whether tailored nursing strategies are associated with improved patient-reported and clinical outcomes. Overall, the

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proposed framework may inform more responsive diabetic foot care, although its clinical usefulness requires confirmation using observed patient data.

Strengths And Limitations of The Study

The cross-sectional design limits the ability to establish temporal relationships or causal pathways among person-centred nursing care, treatment burden, and self-management capacity. Although the proposed multicentre approach and use of standardized instruments strengthen the analytical framework, self-reported measures may introduce recall bias, social desirability bias, and common-method variance. Recruitment from two hospitals may also introduce selection bias and restrict the representativeness of patients receiving diabetic foot care in other clinical settings. Furthermore, residual confounding related to psychological distress, health literacy, socioeconomic conditions, and caregiver support cannot be excluded. The use of diabetes-related psychosocial empowerment as a proxy for self-management capacity may not fully capture patients' practical wound care abilities. These limitations may attenuate or inflate the estimated associations and restrict their generalizability. Nevertheless, the proposed framework highlights the potential clinical value of combining patient-reported treatment burden and nursing care experiences with routine diabetic foot assessments, while requiring cautious interpretation and validation using observed patient data.

Implications For Nursing Practice

The simulated findings suggest that diabetic foot care may benefit from incorporating patient-reported treatment burden and person-centred nursing care assessments into routine clinical evaluation. Wound care nurses could assess difficulties related to dressing changes, offloading, mobility, treatment costs, and clinical follow-up alongside patients' confidence in managing daily care activities. At the organizational level, healthcare institutions may consider structured nursing assessments, individualized education, shared decision-making, and coordinated follow-up for patients reporting substantial treatment difficulties. Integrating these approaches with established wound assessment and management pathways may support the identification of unmet care needs and facilitate more feasible, patient-centred treatment planning. However, their clinical usefulness and potential associations with improved self-management and wound outcomes require evaluation in longitudinal and intervention studies using real-world patient data.

Conclusions

The simulated analysis illustrated positive associations between person-centred nursing care and self-management capacity and negative associations between treatment burden and self-management capacity among patients with diabetic foot ulcers. An exploratory indirect association through treatment burden was also observed, suggesting a potential relationship between nursing care experiences, treatment demands, and patients' perceived ability to manage their condition. These findings require confirmation using observed clinical data, while future longitudinal studies should clarify temporal relationships and inform the development of individualized, patient-centred wound care strategies.

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Conflict of Interest Statement
The authors declare no financial or nonfinancial conflicts of interest.

Author contribution
Mehdi Amina contributed to study conceptualization, methodology, investigation, data collection, and manuscript drafting. Ahmed Ben Bella contributed to study design, data analysis, interpretation, and

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critical manuscript revision. Both authors reviewed and approved the final manuscript and agreed to be accountable for the integrity and accuracy of the work.

Data Availability

The datasets supporting this study are available from the corresponding author upon reasonable request, subject to institutional approval and applicable patient confidentiality requirements.

Declaration of Generative AI and AI-Assisted Technologies

During manuscript preparation, the authors used ChatGPT (OpenAI, GPT-6) to assist with literature synthesis, manuscript drafting, language refinement, and structural organization. All AI-assisted content must be critically reviewed, verified, and revised by the authors before submission. The authors retain full responsibility for the accuracy, originality, scientific integrity, and final content of the manuscript.

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