e-ISSN : 2987-0836 DOI: https://doi.org/10.59585/ijhs

Publish : Association of Indonesian Teachers and Lecturers
International Journal of Health Sciences (IJHS)
Journal Homepage : https://jurnal.agdosi.com/index.php/IJHS/index
Volume 4 | Number 3 | September 2026 |

Predictors of Diabetic Foot Ulcer Prevention Practice among Nurses in Private Wound Care Clinics in Jakarta, Indonesia: A Correlational and Regression Analysis

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Abstract

Knowledge, attitude, and practice (KAP) are frequently assumed to progress sequentially, yet empirical evidence for this pathway in diabetic foot ulcer (DFU) prevention among nurses remains limited, particularly in private wound care settings in Indonesia. This study examined the associations and predictive relationships among demographic characteristics, knowledge, attitude, and practice toward DFU prevention among 167 nurses across eight private wound care clinics in Jakarta. Chi-square tests of association, Pearson's correlation, Spearman's rho, Kendall's tau, and multiple linear regression were applied. Length of service was significantly associated with knowledge and attitude ($p = 0.005$ and $p = 0.031$, respectively) but not practice ($p = 1.000$); age was significantly associated with attitude only ($p < 0.001$); sex showed no significant association with any KAP domain. Knowledge was significantly and consistently correlated with practice across all three correlation coefficients (Pearson's $r = -0.379$, $p < 0.001$), whereas attitude showed no significant association with practice. Multiple regression confirmed knowledge as the sole significant predictor of practice ($B = -0.375$, $p < 0.001$), explaining 14.9% of practice variance, while demographic variables explained only 3.1% and were not significant predictors. These findings indicate that knowledge, rather than attitude or demographic characteristics, is the primary driver of DFU prevention practice, with substantial unexplained variance suggesting the influence of organizational and contextual factors not captured in this model.

Keywords: Diabetic Foot Ulcer, Prevention Practice, Nurses

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Resive : 23 September 2026
Revised : 28 September 2026
Accept : 28 September 2026
Publish : 28 September 2026

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e-ISSN : 2987-0836 DOI: https://doi.org/10.59585/ijhs

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1. Introduction

Diabetic foot ulcer (DFU) prevention depends heavily on the consistent translation of nurses' clinical knowledge and professional attitudes into evidence-based screening and educational practices. The Knowledge-Attitude-Practice (KAP) framework has long served as an organizing model in health behavior research, positing that knowledge shapes attitude formation, which in turn influences practice behavior. However, whether this sequential relationship holds empirically among nurses delivering DFU prevention care particularly within resource-constrained, LMIC settings remains inconsistently demonstrated across the literature.

Several studies have reported divergent findings regarding which KAP component most strongly determines actual clinical practice. Some evidence suggests that nurses with higher diabetic foot ulcer knowledge consistently demonstrate better clinical practices, including foot screening, patient education, and risk identification (Sadiqullah et al., 2024). However, positive attitudes have not always corresponded with improved practice performance, with organizational barriers, staffing shortages, and limited resources frequently preventing favorable attitudes from translating into consistent clinical action (Hasan et al., 2026). This inconsistency suggests that the assumed linear KAP pathway may not adequately describe real-world nursing behavior, and that knowledge and attitude may exert independent, rather than sequential, effects on practice.

Demographic and professional characteristics age, sex, and length of service have also been proposed as potential determinants of KAP outcomes, though findings across studies are mixed. Professional experience and exposure to diabetic foot care have been identified as important factors influencing nurses' knowledge levels, with nurses possessing more years of specialized experience generally demonstrating greater competence (Sadiqullah et al., 2024). Conversely, other demographic characteristics, including sex, have been reported as weak predictors of diabetic foot care competencies and preventive practices in several contexts (Hasan et al., 2026).

Understanding which factors most strongly and independently predict DFU prevention practice carries direct implications for the design of continuing education interventions. If knowledge is confirmed as the dominant predictor, resource allocation toward structured, competency-based training would be justified over broader attitudinal or motivational interventions. Conversely, if attitude or demographic characteristics emerge as significant predictors, alternative intervention strategies such as organizational culture change or targeted recruitment/retention strategies would warrant greater emphasis.

This study builds on a companion descriptive analysis of the same nurse cohort, which characterized the overall level of knowledge, extent of attitude, and extent of practice toward DFU prevention across eight private wound care clinics in Jakarta [Author, in preparation]. Building on that descriptive foundation, the present study aimed to examine (1) the association

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between nurses' demographic profile and their knowledge, attitude, and practice toward DFU prevention, (2) the correlational relationships among knowledge, attitude, and practice, and (3) the predictive contribution of demographic characteristics, knowledge, and attitude to nurses' DFU prevention practice

2. Methods

This study employed a cross-sectional correlational and predictive design, conducted across the same eight private wound care clinics in Jakarta, Indonesia, and the same participant cohort described in a companion descriptive analysis. Reporting followed the STROBE checklist for cross-sectional studies.

A total of 167 nurses were purposively sampled using the inclusion criteria of (1) at least six months of direct clinical experience in wound care, (2) active involvement in DFU assessment, management, or patient education, and (3) willingness to participate.

Knowledge and attitude were measured using the validated *Knowledge and Attitude Instrument for Nurses for the Prevention of the Diabetic Foot* (Cronbach's α = 0.84 knowledge; 0.70 attitude) (Sarmiento-Luna et al., 2023). Practice was measured using the *Nurses Practice Observational Checklist* (Cronbach's α = 0.847) (Abdullah et al., 2017). Full instrument descriptions are reported in the companion descriptive paper

Categorical associations between demographic characteristics and KAP levels were analyzed using the Chi-square test. Pearson's product-moment correlation, Spearman's rho, and Kendall's tau-b were used to examine the relationships among knowledge, attitude, and practice scores. Multiple linear regression was conducted to identify predictors of practice, including knowledge, attitude, age, sex, and length of service. Model fit was assessed using R^2, adjusted R^2, F-statistics, and residual diagnostics. Statistical significance was set at $\alpha = 0.05$, and all analyses were performed using SPSS.2.5. Ethical Considerations

3. Results and Discussion

a. Result

1) Demographic Associations with Knowledge, Attitude, and Practice. Age was not significantly associated with knowledge level ($p = 0.803$) or practice extent ($p = 1.000$), but was significantly associated with attitude extent ($p < 0.001$). Sex showed no significant association with knowledge ($p = 0.088$), attitude ($p = 0.053$), or practice ($p = 0.253$). Length of service was significantly associated with both knowledge ($p = 0.005$) and attitude ($p = 0.031$), but not with practice ($p = 1.000$).
2) Correlations among Knowledge, Attitude, and Practice. Knowledge and attitude showed an inconsistent relationship: a statistically significant weak negative Pearson correlation ($r = -0.158$, $p = 0.042$) was observed, but this was not confirmed by Spearman's rho ($p = 0.154$) or Kendall's tau ($p = 0.169$), indicating no robust relationship across methods. Knowledge and practice demonstrated a consistent, statistically significant relationship across all three coefficients (Pearson's $r = -0.379$,

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$p < 0.001$; Spearman's rho = −0.174, $p = 0.025$; Kendall's tau = −0.131, $p = 0.023$); because knowledge was reverse-coded, these negative coefficients indicate that higher knowledge (lower score) was associated with higher practice scores. Attitude and practice showed no significant relationship across any of the three coefficients.

3) Predictors of Practice: Knowledge and Attitude. The regression model examining knowledge and attitude as predictors of practice was statistically significant, $F(2,164) = 14.30$, $p < 0.001$, $R = 0.385$, $R^2 = 0.149$, adjusted $R^2 = 0.138$ (RMSE = 0.163). Knowledge was a significant predictor of practice (B = −0.375, SE = 0.070, t = −5.347, $p < 0.001$), whereas attitude was not (B = −0.020, SE = 0.020, t = −0.990, $p = 0.324$).
4) Predictors of Practice: Demographic Characteristics. The regression model examining age, sex, and length of service as predictors of practice was not statistically significant, $F(3,163) = 1.727$, $p = 0.164$, $R = 0.175$, $R^2 = 0.031$, adjusted $R^2 = 0.013$ (Durbin-Watson = 2.083, indicating no substantial autocorrelation). None of the individual predictors reached significance: age ($\beta = -0.122$, $p = 0.203$), sex ($\beta = 0.139$, $p = 0.079$), and length of service ($\beta = 0.119$, $p = 0.215$).

b. Discussion

This study examined the associations and predictive relationships among demographic characteristics, knowledge, attitude, and practice toward DFU prevention among nurses in Jakarta's private wound care clinics, extending a companion descriptive analysis of the same cohort.

The significant association between length of service and both knowledge and attitude, without a corresponding association with practice, suggests that accumulated clinical experience contributes meaningfully to cognitive and affective competencies but does not, on its own, translate into differentiated clinical behavior. This pattern is consistent with prior findings that professional experience and exposure to diabetic foot care are important determinants of nurses' knowledge (Sadiqullah et al., 2024), while nursing practice behaviors are more strongly shaped by organizational factors, workload, and resource availability than by individual experiential characteristics (Hasan et al., 2026). The absence of a significant sex-based difference across all three KAP domains similarly supports the broader literature indicating that biological sex is a weak predictor of diabetic foot care competencies, with professional education and institutional training exerting greater influence (Hasan et al., 2026).

The most consequential finding of this study is the inconsistent knowledge-attitude relationship, contrasted with the robust and consistent knowledge-practice relationship. This pattern diverges from the strict sequential assumption of the KAP model, in which knowledge is theorized to shape attitude, which subsequently determines practice. Instead, these findings suggest that knowledge exerts a direct effect on practice that does

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not require mediation through attitude a pattern also observed in prior nursing populations, where favorable attitudes did not consistently correspond with improved practice performance, with organizational barriers and limited resources frequently preventing translation of positive attitudes into clinical action (Hasan et al., 2026).

Knowledge emerged as the only significant predictor of practice in the multiple regression model, consistent with evidence that nurses with higher diabetic foot ulcer knowledge consistently demonstrate better clinical practices, including routine foot assessment and risk identification (Sadiqullah et al., 2024). The modest explanatory power of the model ($R^2 = 0.149$) indicates that while knowledge is a necessary contributor to practice, a substantial proportion of variance (85.1%) remains attributable to factors not captured in this study, such as organizational support, equipment availability, workload, and self-efficacy factors that warrant investigation in future research.

The non-significant regression model for demographic predictors reinforces the interpretation that DFU prevention practice in this setting is likely governed more by standardized clinical protocols and institutional expectations than by individual nurse characteristics. This finding carries a practical implication: interventions aimed at improving practice should prioritize knowledge-based competency development applicable uniformly across the nursing workforce, rather than targeting specific demographic subgroups.

These findings support prioritizing structured, competency-based educational interventions—rather than attitude-focused or demographically targeted programs—as the primary lever for improving DFU prevention practice in this setting. Limitations include the cross-sectional design, which precludes causal inference regarding the direction of the knowledge-practice relationship, and the modest proportion of variance explained by the regression model, suggesting that unmeasured contextual and organizational variables should be incorporated in future predictive models..

4. Conslusion

Among nurses in Jakarta's private wound care clinics, knowledge—rather than attitude or demographic characteristics—was the sole significant predictor of diabetic foot ulcer prevention practice, while length of service and age were associated with knowledge and attitude but not with practice itself. These findings challenge a strictly sequential interpretation of the Knowledge-Attitude-Practice model in this context and suggest that continuing professional education efforts should prioritize structured knowledge development as the most direct pathway to improving nurse-led DFU prevention practice.

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