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Short communication

Factors associated with dietary supplement use in patients with type 2 diabetes mellitus

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Introduction

Patients with type 2 diabetes mellitus (T2DM) frequently use dietary supplements to support general health and glycemic control, with studies reporting complementary and alternative medicine use in up to 51% of patients (Alzahrani et al., 2021). Given the growing global burden of diabetes, projected to reach 13% prevalence by 2050 (Magliano & Boyko, 2025), healthcare professionals should be aware of potential risks associated with supplement use, including adverse effects, drug–supplement interactions, polypharmacy, and reduced treatment adherence. Commonly used non-prescription products include vitamins, minerals, omega-3 fatty acids, and plant extracts. This study aimed to evaluate how demographic, socioeconomic, knowledge-related, and clinical factors influence supplement use among individuals with T2DM, and to assess whether supplement use contributes to the burden of polypharmacy.

Materials and methods

A survey was designed and distributed to 64 patients receiving diabetes care in the Clinical hospital in Stip, N Macedonia, after received approval of hospital's ethical committee (No. 03-321/2 from 31.3.3026). The analysis performed using Jamovi software (v. 2.6.45.0), included descriptive statistics for characterization of sociodemographic variables, while associations between supplement use and clinical factors, as duration of diabetes, number of disease complications, and therapy type were evaluated using appropriate inferential statistical tests, including analyses to identify independent predictors of supplement intake.

Results and discussion

The surveyed patients with T2DM aged from 27-81 years, of whom 35 (54.7%) were female. Of 64 patients, 60.9% reported having T2DM over ten years, and most of them (64.1%) used combination of oral antidiabetics and insulin, while only 4 (6.3%) reported using insulin exclusively for glucose control. The number of reported T2DM complications was highest in patients older than 65 years, with a mean of 2.59 complications per patient.

The reported use of supplements was relatively high, with 70.31% of the patients using one or more dietary supplement. Most used supplement was vitamin C (21.19%), followed by magnesium (19.49%). The physicians were the most frequently consulted regarding the supplement use (50%), followed by self-advice (25%) and family and

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friends (23.44%). Pharmacists were consulted for use of supplements by 13 patients (20.31%). A series of Fisher's exact tests showed no significant association between patients' education level and need for advice ($p > 0.05$).

Spearman's rank-order correlation was performed to assess the relationship between age and number of supplements reported. There was statistically significant, moderate negative correlation (r = -0.307, p = 0.013), suggesting that supplement intake tends to lower with progressing age.

The performed Kruskal-Wallis test showed no significant difference in the number of supplements taken between the groups of patients exposed to different antidiabetic treatment (oral, insulin or combination) ($H(2) = 0.534$; $p = 0.769$). However, the patients receiving combination therapy had the highest median supplement count. In addition, no relation was registered between the number of supplements and reported income ($H(2) = 1.05$, $p = 0.593$), as an important economical factor affecting consumers behavior.

Multiple outcomes were analyzed to assess different dimensions of supplement-related behavior, knowledge, and perception of patients, using education level as a possible predictor. The Kruskal–Wallis test showed no significant association between education level and the number of supplements used ($H(2) = 4.53$, $p = 0.210$). In addition, no significant difference between the education level and self-perceived knowledge regarding supplements was evidenced (c^2=9.96, df=6, Fisher exact $p = 0.075$). However, education level was found to be associated with better objective knowledge regarding supplements, as determined by Kruskal-Wallis test ($H(3) = 13.4$, $p = 0.004$). This finding points that self-perceived and objective knowledge present two different dimensions of health (supplement) literacy. Thus, although individuals with higher education presented better knowledge, they did not report greater confidence in their knowledge, showing that other factors, may influence factual confidence as well.

A Poisson regression analysis was performed to identify predictors of supplement use. The model showed that age was a significant negative predictor of supplement use (B = −0.0274, SE = 0.00779, $p < 0.001$, Exp(B) = 0.973), indicating that older patients tended to use fewer supplements when controlling for education and number of complications.

Supplement use differed between the groups with different education levels, with elementary education as the reference group, after adjusting for age and number of complications. A significant difference was observed only among patients with postgraduate education (B = 0.7605, SE = 0.37917, p = 0.045, Exp(B) = 2.139), indicating that these patients had a significantly higher rate of supplement use compared with those with elementary education, which is consistent with other findings (Jiang et al., 2024). However, number of reported complications was not independently associated with supplement intake after adjusting for age and education.

Conclusion

In this research, supplement use was influenced more by demographic and socioeconomic factors than by clinical complexity. Younger age and postgraduate education were associated with higher supplement consumption. In contrast, clinical complications and therapy type did not significantly influence supplement use, while information-seeking behavior remained consistent across groups. These findings highlight the need for clearer patient education and evidence-based guidance to support informed and safe supplement use in diabetes care.

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