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Letter

Evaluating sleep and dietary assessment within composite lifestyle scores: Implications for mortality research in type 2 diabetes

Dear Editor,

We read with great interest the prospective cohort study conducted by Yu *et al*[1], which examined the association between a composite healthy lifestyle score and mortality risk among individuals with type 2 diabetes mellitus (T2DM). The study is commendable for its large sample size, extended follow-up, and integrated evaluation of multiple behavioral domains, thereby making a meaningful contribution to the understanding of lifestyle influences on long-term prognosis in this high-risk population.

We would like to offer several methodological considerations regarding the operationalization of sleep and dietary variables within the composite score, as exposure definition and measurement precision may influence risk estimation and interpretability.

Sleep duration was categorized as adequate when ranging between 7 and 8 hours per day[1]. Although this is consistent with commonly cited recommendations, sleep health is increasingly conceptualized as a multidimensional construct encompassing duration, timing, regularity, quality, and circadian alignment[2]. Importantly, although sleep duration has been consistently associated with cardiometabolic diseases and mortality, recent evidence suggests that its inclusion provides only limited incremental value in clinical prediction models[3–4]. Recent investigations have further demonstrated that sleep irregularity is independently associated with cardiovascular risk irrespective of mean sleep duration[5], and meta-analyses continue to demonstrate a U-shaped association between sleep duration and type 2 diabetes risk[6]. Moreover, circadian misalignment and social jet lag have been linked to metabolic dysfunction and obesity, while an evening chronotype has been associated with higher cardiometabolic morbidity and mortality independent of total sleep time. Contemporary frameworks emphasize that assessing only duration may not adequately capture the biological complexity of sleep health and its metabolic implications[2].

Regarding dietary assessment, the classification of a healthy diet based on the consumption of at least half of recommended food categories[1] represents a pragmatic strategy. However, structured dietary indices offer a more comprehensive assessment of habitual intake. Diet quality indices such as the Healthy Eating Index (HEI) have demonstrated consistent associations with mortality and chronic disease risk[7]. In addition, the emerging concept of chrono-nutrition highlights the importance of the timing of food intake in relation to circadian rhythms, which has been increasingly associated with cardiometabolic diseases and mortality[8]**.** Recent analyses among individuals with diabetes further support that adherence to high-quality dietary patterns is associated with improved survival and reduced cardiometabolic complications[9]. Established dietary patterns such as the Mediterranean diet have also shown protective effects against cardiovascular disease in both randomized and observational settings[10].

These approaches account for nutrient density, macronutrient proportionality, and the limitation of components associated with metabolic risk, providing a more nuanced representation of dietary quality than binary food group categorization. In individuals with T2DM, dietary characteristics such as carbohydrate quality and ultra-processed food consumption may substantially influence long-term outcomes and may

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not be adequately captured by simplified classifications.

In composite indices, the validity and precision of each individual component are particularly important. Assigning equal weight to heterogeneous behavioral domains assumes comparable impact, whereas differential measurement accuracy may influence the relative contribution of each factor to the overall score.

These observations are intended to complement, rather than detract from, the valuable findings reported by Yu *et al*[1]. Incorporating multidimensional and validated instruments for sleep and dietary assessment may enhance exposure characterization, strengthen risk estimation, and deepen the mechanistic understanding of lifestyle–mortality relationships in T2DM.

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Yours sincerely,

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Author contributions

N.R.M.P. and H.H. conceptualized the study. N.R.M.P. drafted the manuscript. I.A.I. and S.T. contributed to critical revision of the manuscript. All authors approved the final version of the manuscript.

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