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Peer Review

Review of: "Dermatoglyphics: The Future of Screening Type 2 Diabetes Mellitus?"

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This study presents an original and thought-provoking exploration of the association between fingerprint patterns and type 2 diabetes mellitus (T2DM). By comparing dermatoglyphic features in diabetic patients and healthy individuals, the authors contribute to an emerging field that intersects genetics, epidemiology, and biometric screening. One of the main strengths of the work is its grounding in both biological plausibility and public health relevance, especially given the increasing global burden of undiagnosed T2DM.

The introduction is well-structured and provides a solid theoretical background. The authors clearly explain the concept of dermatoglyphics, its genetic underpinnings, and potential implications for disease screening. The historical and scientific rationale is well established, referencing both classical and recent studies. However, the introduction could benefit from a more explicit articulation of the study hypothesis and a clearer statement of research questions. For instance, is the goal to establish predictive markers, explore associations, or propose a diagnostic tool?

The methodology is appropriate for a preliminary, cross-sectional investigation. The inclusion and exclusion criteria are rigorous, and ethical safeguards are well described. The fingerprint collection procedure is standard and follows established guidelines, which supports the reproducibility of the study. The use of two independent researchers to classify fingerprint patterns strengthens internal validity. Nonetheless, the choice of Henry's classification system, while historically robust, may limit the granularity of analysis. Could more advanced digital methods or multidimensional pattern classification (e.g., TFRC, ridge counts, or AI-driven pattern recognition) enhance diagnostic sensitivity?

In terms of results, the descriptive data are clearly presented, and tables support the narrative effectively. The finding that whorl patterns dominate in both groups is consistent with previous literature. However, the observation of more frequent loops in diabetic individuals—except in the thumbs, where healthy

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individuals exhibit more loops—raises intriguing questions about digit-specific variation. The statistically significant differences in thumb patterns ($p < 0.05$) deserve further exploration. Could these asymmetries reflect developmental or genetic differences with pathophysiological implications? Would the use of multivariate analysis or logistic regression yield more insight into such associations?

While the authors acknowledge the limitations of their sample size and cross-sectional design, the discussion would be enriched by a more detailed analysis of potential confounding variables. For example, did the authors consider the role of body mass index, family history of diabetes, or ethnicity? Could environmental exposures or epigenetic factors influence both fingerprint formation and T2DM risk? Without adjustment for these factors, the causality or predictive value of the observed associations remains speculative.

The discussion section is comprehensive, offering comparisons with global and regional studies. This contextualization strengthens the article and situates it within the broader dermatoglyphic research landscape. However, the authors might have explored more deeply the heterogeneity of findings across populations. For instance, the inconsistencies between this study and others in Iran, India, or Morocco suggest that fingerprint-disease associations may vary by genetic background. Could a meta-analysis of existing studies clarify these discrepancies?

One notable contribution of the article is the potential application of fingerprint analysis in public health screening. The authors rightly note the barriers to conventional diabetes diagnosis in low-resource settings. Dermatoglyphics could, in theory, offer a non-invasive, low-cost triage tool for early identification. However, this potential should be framed more cautiously. How would such a tool perform in terms of sensitivity, specificity, or predictive value compared to biochemical markers? What ethical considerations arise when using immutable biometric traits in disease prediction?

The strength of the article lies in its multidisciplinary scope and its relevance to underserved populations. The authors provide a compelling argument for further research and suggest that with technological advances, such as machine learning, more nuanced analyses of dermatoglyphic patterns could be achieved. However, the study's generalizability is limited due to its single-center design and relatively small sample. A multicenter or population-based study would be needed to validate these findings.

In conclusion, this paper contributes to the growing body of evidence suggesting that fingerprint patterns may correlate with chronic disease risk. The findings, while preliminary, are valuable and open avenues for future investigation. Importantly, the study raises a central question: Can something as

immutable and personal as a fingerprint tell us something about our metabolic future? With further validation and technological refinement, dermatoglyphics might one day move from forensic science to frontline medicine.

Declarations

Potential competing interests: No potential competing interests to declare.