A Qualitative Validation of Wearable Sleep-Tracking Technology Against Polysomnography for Obstructive Sleep Apnoea in an Obese African Cohort at Aga Khan University Hospital, Nairobi

T, h, a, n, d, i, w, e, N, k, o, s, i, ,, L, e, r, a, t, o, M, o, k, o, e, n, a, ,, P, i, e, t, e, r, v, a, n, d, e, r, M, e, r, w, e

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Abstract

Obstructive sleep apnoea (OSA) is a significant but underdiagnosed comorbidity in obese populations across Africa. Polysomnography (PSG) is the diagnostic gold standard, but its limited availability necessitates investigation of accessible alternatives. Validation of consumer wearable sleep-tracking technology within African clinical contexts remains scarce. This study aimed to qualitatively validate a wearable sleep-tracking device against in-laboratory PSG for identifying OSA in an obese cohort. The objectives were to explore the device's performance characteristics, its alignment with PSG-derived metrics, and to understand patient experiences and perceptions of both diagnostic methods. A qualitative, instrumental case study was conducted at the sleep laboratory of Aga Khan University Hospital, Nairobi. A purposively sampled cohort of obese patients (BMI ≥30 kg/m^2) with suspected OSA underwent concurrent overnight PSG while wearing a commercially available wrist-worn sleep tracker. Data collection involved in-depth analysis of device-generated sleep reports compared to PSG scores, followed by semi-structured interviews with participants regarding their experience. Thematic analysis was employed for the interview data. Comparative analysis revealed a consistent trend of the wearable device underestimating sleep latency and overestimating total sleep time relative to PSG. A prominent theme from patient interviews was a strong preference for the wearable device's

comfort and convenience in a home setting, contrasted with the acknowledged clinical authority but reported intrusiveness of PSG equipment. The wearable device demonstrated notable discrepancies in specific sleep metrics compared to PSG, limiting its utility for precise diagnostic classification of OSA severity in this cohort. However, its high acceptability suggests potential utility as a screening tool to prompt formal referral. Further qualitative research should explore clinician perspectives on integrating wearable data into diagnostic pathways. Device algorithms may require population-specific calibration. PSG remains essential for definitive diagnosis. obstructive sleep apnoea, wearable electronic devices, polysomnography, qualitative research, obesity, Kenya This study provides qualitative insights into the performance and patient acceptability of a wearable sleep-tracking device versus polysomnography in an obese African cohort, contributing to the discourse on alternative diagnostic strategies in resource-conscious settings.