

Validation of Fitbit Blaze Activity Monitor during Treadmill Walking and Running

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Fitbit activity monitors are growing in popularity and have become an integral part of one's lifestyle. However, before placing trust in these devices, their validity and reliability must be determined. **Purpose:** To compare step counts obtained by Fitbit Blaze with the observed step counts obtained by video recordings during treadmill walking and running in order to evaluate the accuracy of the device in determining steps taken at different speeds. **Methods:** Thirty-Four apparently healthy participants (22M/12F; age range:19-55years, mean BMI: 26.8 kg/m²) completed a 4-stage treadmill exercise protocol, consisting of walking at slow (1.9mph), moderate (3.0mph), and brisk (4.0mph) paces, and jogging (5.2mph); 6min duration/stage with a Fitbit Blaze worn on their left wrist. Observed steps were assessed by manual counting of a video recording in one-minute epochs. **Results:** Fitbit Blaze vs. observed video (Mean±SD) step count (2965 ± 162 vs. 2958 ± 141 steps; p=0.706) was not statistically significant. Estimated step counts from the wrist based Fitbit Blaze strongly correlated with observed step counts (r=0.797; p<0.01). The difference between Fitbit-estimated step counts and observed step counts ranged from -305 steps to 209 steps, with a standard deviation of 120 steps. While sometimes the Fitbit Blaze underestimated or overestimated the step counts, overall the mean step counts across all participants resulted in a difference of 6.44 steps or 0.22% error, thus indicating its general accuracy across a larger population **Conclusion:** The Fitbit Blaze is a fairly accurate and reliable device for measuring step counts at various speeds of walking and running among healthy adults. Such simple, cost effective monitors could be used in large scale to assess physical activity patterns in different populations.

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