The inter- and intra-unit variability of a low-cost GPS data logger/receiver to study human outdoor walking in view of health and clinical studies

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PURPOSE: The present study evaluates the intra- and inter-unit variability of the GlobalSat(R) DG100 GPS data logger/receiver (DG100) when estimating outdoor walking distances and speeds. METHODS: Two experiments were performed using healthy subjects walking on a 400 m outdoor synthetic track. The two experiments consisted of two different outdoor prescribed walking protocols with distances ranging from 50 to 400 m. Experiment 1 examined the intra-unit variability of the DG100 (test-retest reproducibility) when estimating walking distances. Experiment 2 examined the inter-unit variability of four DG100 devices (unit to unit variability) when estimating walking distances and speeds. RESULTS: The coefficient of variation [95% confidence interval], for the reliability of estimating walking distances, was 2.8 [2.5-3.2] %. The inter-unit variability among the four DG100 units tested ranged from 2.8 [2.5-3.2] % to 3.9 [3.5-4.4] % when estimating distances and from 2.7 [2.4-3.0] % to 3.8 [3.4-4.2] % when estimating speeds. CONCLUSION: The present study indicates that the DG100, an economical and convenient GPS data logger/receiver, can be reliably used to study human outdoor walking activities in unobstructed conditions. This device let facilitate the use of GPS in studies of health and disease.

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