

ORAL PAPER PRESENTATION 3: PHYSICAL AND MENTAL HEALTH

Influence of cardiovascular risk, hypertension and diabetes in accelerometry features

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Purpose Some medical conditions and risk factors are associated with differences in mobility, such as affective disorders and psychiatric conditions (Cruz-Jimenez, 2017). Some studies have already investigated the use of inertial sensors to identify specific health conditions, such as Parkinson's disease, changes in balance, postural control, gait, falls, and frailty (Ponciano et al. 2020), however, there is no research that gathers information about the influence of factors such as cardiovascular risk, hypertension, and diabetes on accelerometry features based on human gait. The aim of this study was to identify which accelerometry features extracted from the use of a triaxial accelerometer during 7 days of activities of daily living are associated with cardiovascular risk, hypertension, and diabetes. **Method** A cross-sectional study was conducted based on the database of the first wave of the Epidemiological Study of Movement (EPIMOV) cohort. Participants aged over 18 years old used an accelerometer during 7 days of daily life activities. Participants whose accelerometry data showed errors, such as incomplete or inconsistent data, were excluded. Data related to cardiovascular risk (body fat % and sedentary lifestyle), hypertension, and diabetes were collected through anamnesis. Features of entropy (PSE) and amplitude (PSP1, PSP2, PSP3) were extracted from the accelerometer signal. These accelerometry features have previously been successfully explored to identify other health conditions (Bet et al. 2021). We developed a series of stepwise multiple linear regression models using the aforementioned accelerometry features with outcomes (dependent variables) and cardiovascular risk, hypertension, and diabetes attributes as potential predictors (independent variables). Statistical analysis was performed using SPSS® version 23. **Results and Discussion** The sample was composed of 1080 participants, mostly female (58.7%). Participants were divided into three groups according to their age: 18-39 years old (n=502), 40-59 years old (n=424), and ≥ 60 years old (n=154). In relation to the cardiovascular risk, 42.2% of the sample have a sedentary lifestyle and the average body fat percentage of the sample was 29.25. Besides, 15.6% of the sample have hypertension and 8.6% have diabetes. According to the multiple regression results (see Table 1), only cardiovascular risk variables were associated with accelerometry variables - the sedentary lifestyle was associated with entropy and amplitudes of the accelerometer signal (PSE, PSP1, PSP2, and PSP3), and the body fat percentage was associated with entropy, first and second amplitude of the signal (PSE, PSP1, and PSP2). Hypertension and diabetes were not associated with accelerometry features based on human movement. Therefore, the results may demonstrate more influence of body fat (%) and a sedentary lifestyle on human movement patterns than the health conditions such as hypertension and diabetes. Future studies may investigate these variables when analyzing human movement.

References

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Table 4 Results of stepwise multiple linear regression analyzes for the prediction of accelerometry features based on cardiovascular risk, hypertension and diabetes attributes.

	B	SD	Beta	R ²	R ² Adjusted	p-value
PSE						
Body fat (%)	-0.028	0.011	-0.105	0.125	0.124	0.010
Sedentary lifestyle	-1.212	0.158	-0.246	0.182	0.180	0.000
PSP1						
Body fat (%)	0.010	0.005	0.082	0.079	0.078	0.059
Sedentary lifestyle	0.396	0.077	0.174	0.108	0.106	0.000
PSP2						
Body fat (%)	0.444	0.091	0.170	0.046	0.045	0.000
Sedentary lifestyle	-0.178	0.069	-0.088	0.067	0.064	0.010
PSP3						
Sedentary lifestyle	-0.284	0.044	-0.215	0.072	0.071	0.000

Note: features were adjusted for age, sex, education, number of falls, dyslipidemia and smoking.