

# Validity of the Leisure Time Physical Activity as a Health Indicator

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## 1. Self reported Physical Activity in a study in Norway, 1974-1999

The objectives of this study are: a) To describe changes in self reported physical activity in 40-42 year old men and women in Norway from 1974 to 1999; b) To assess the relation between physical activity and the biological variables such as body mass index, blood pressure, total cholesterol, triglycerides and total cholesterol, taking into account gender, year of examination and smoking habits and c) To corroborate the validity of the variable physical activity by assessing the consistency of the above analysis. The study population consists of 332182 individuals (172032 women and 160150 men; aged 40-42) from different counties in Norway who were invited to participate in health survey during 1974 to 1999. The examination consisted of blood pressure, weight and height measurements and a venous blood sample for lipid analysis. In addition they were asked to fill in a questionnaire concerning health status, physical activity, living and smoking habits and social conditions.

## 2. Methods

Changes in leisure time physical activity were analyzed in relation to year of birth and gender. Self reported physical activity is measured on four levels according to the following question:

*Exercise and physical exertion in leisure time. If your physical activity varies much, for example between summer and winter, then give an average. The questions refer only to the last twelve months. Tick "YES" beside the description that fits best:*

*1. Reading, watching TV, or other sedentary activity?*

*2. Walking, cycling, or other forms of exercise at least 4 hours a week?*

*3. Participation in recreational sports, heavy gardening, etc.? (Note: at least 4 hours a week).*

*4. Participation in hard training or sports competitions, regularly several times a week?*

Thus the four levels are denoted by: 1 = No Exercise, 2 = Little Exercise, 3 = Exercise and 4 = Hard Exercise. Moreover, the variable year of birth is classified in three levels: '30' those who were born

before 1940, '40' those born between 1940 and 1949, '50' those who were born from 1950 and after. Multiple regression analyses were performed to assess association between self-report physical activity and the biological variables. To analyze the relation between physical activity and levels in biological variables the statistical analyses were performed by gender, smoking habits and decade of birth; taking into account possible interactions between variables. The dependent variables are: body mass index (BMI), total cholesterol, serum triglycerides, systolic and diastolic blood pressure. The independent variables are date of birth, gender, leisure time physical activity (graded 1-4 with increasing physical activity), smoking habits, the interaction between physical activity and gender and the interaction between physical activity and date of birth. Analyses of covariance were performed to assess the validity of the variable physical activity in relation to Serum cholesterol and BMI. These latter variables were chosen due to the stable measurement methods used during the period.

### 3. Results

The relation between *physical activity* and *decade of birth* by gender, differ for men and women. A significant negative linear relation ( $p < 0.0001$ ) was observed for the men, whereas the women show positive relation. This implies that the *physical activity* among men has decreased in the last years while the *physical activity* among women has increased or remained stable. Multiple regression analyses show that the mean BMI increases in relation to year of birth for both women and men. All the independent variables included above contributed significantly to the regression ( $p < 0.001$ ). Together they explained 6% of the total variance. This may seem low regarding the number of observations in the population. However, this is not unexpected if we take into account that BMI depends also on other factors as diet, cigarette consumption, etc., which were not considered in this study. The lowest values for BMI in women are seen for smokers with physical activity level 2 and the highest values are seen for non-smokers men with physical activity level 1. Similar analyses show significant changes in Serum cholesterol mean values for women and men. The lowest values are given for the group of women for physical activity level 4, non-smokers; and the highest values belong to the group of men with physical activity level 1, smokers. Multiple regression analyses on Serum Triglycerides, Systolic and Diastolic blood pressure did not provide satisfactory models. Physical Activity was not a significant factor neither was the interaction of Decade of Birth and Physical Activity. This may be due to a lack of consistency in the measurement methods. The covariate Year of Birth was introduced into the model of analysis-of-variance to perform a parallel-slopes analysis of covariance. The results showed that only one level of interaction is statistically significant. We conclude that the test is extremely sensitive due to the large of the population and that the coefficients of the interaction term are negligible. We also conclude the slopes relating Year of Birth to serum cholesterol and BMI are parallel for Physical Activity and that the validity of the variable is acceptable.

#### References:

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