

## REGULAR EXERCISE A PROFILE OF THE INACTIVES

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### Introduction

Active individuals seem to be at lower risk for heart disease than those more sedentary<sup>1-3</sup>, although the protective role of exercise has not yet been convincingly established<sup>4</sup>. Regular physical exercise is associated with lower levels of blood lipids, obesity and hypertension<sup>5-6</sup>. There is doubt, however, whether exercise itself is beneficial or merely reflects personal selection and a healthier constitution<sup>3</sup>. Exercise often leads to health consciousness, resulting in a reduction in cigarette smoking, a change in diet<sup>1</sup>, and improved psychological fitness<sup>7</sup>. Potential benefits of physical activity on health, however, only result from long term, regular participation.

To stimulate physical activity, Thomas<sup>1</sup> stated that the objectives center around providing encouragement (getting people interested in exercise), providing reinforcement (keeping them interested), and providing facilities (places to exercise). Creating interest in exercise primarily requires identification of the target population of inactives, for more effective education and motivation. Data<sup>4,8-10</sup> on physical activity show that, among others, older age, low level of socioeconomic status and smoking are correlates of physical inactivity. This report contributes information on the sociodemographic determinants of leisure time physical inactivity studied in a random sample of the Dutch adult population.

### Methods

Data on physical activity of the Dutch adult population were collected in 1978 through a nation-wide survey on public knowledge, attitude, and behaviour with respect to cardiovascular risk indicators, i.e. smoking, nutrition habits, obesity and physical activity. A stratified random sample of 2,562 men and women, aged between 18 and 64 years, and representative of the Dutch adult population was drawn. The response rate was 77 per cent. There were 14 per cent refusals, and 9 per cent could not be reached. All subjects participating in the survey were personally interviewed at their homes, according to a structured questionnaire, by a team of 174 professional interviewers.

Of the 1,973 subjects in the survey, 889 men and 1,062 women provided complete information on relevant variables.

Leisure time physical activity was ascertained by inquiring about the number of minutes per week the respondents engaged in sports, walking, or cycling. Sixty minutes per week devoted to sports or equivalent time<sup>11</sup> in cycling (75 min/week) or walking (90 min/week) were taken as cut-off points to distinguish between the active and inactive subjects. The inactive group (n=856) included those not practising regularly any activity, or those practising one regularly but less than the above mentioned time. Those who regularly participated in at least two activities and exceeded the time limits were classified as active (n=263). The intermediate group (n=832) was not included in the analysis. Sedentary living was measured as the hours per day occupied by sedentary activities.

Self-reported weight and height were used to calculate Body Mass Index (BMI), as the ratio of weight (in kg.) and the square of the height (in m.). Obesity was defined as BMI  $\geq$  27 for men and BMI  $\geq$  26 for women. Sociodemographic information included: sex, age, civil status (married, unmarried, divorced/widowed), family size (number of members in the household), urbanization level (urban, rural), education (primary school/low vocational training, higher education), occupation (blue and lower white collar workers, all others), and familial social class (lower class, all others).

Attitude items (see Table 4) were tested in a pilot study with 150 individuals. The answers ranging from "strongly agree" to "strongly disagree" were scored in a five-point Likert type scale. The reliability of the scale expressed as Cronbach's alpha<sup>12</sup> was 0.76.

Specification of one or more categories on the basis of common characteristics out of a heterogeneous population is called target group segmentation. For leisure time physical activity this was performed by using Fisher's linear discriminant function<sup>13</sup> to examine which of a series of variables, discriminate between the two groups. The function describes the target group, the inactive category, in comparison to the active group in an additive linear model:

$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n$ . The coefficient  $\beta$  indicates whether a variable distinguishes between the two groups. In this way the independent contribution of a determinant, can be estimated and effects of in-

terrelations of determinants, which cannot be detected in 2x2 contingency tables, will be eliminated. In this form the technique yields results similar to those of a binary regression analysis.

By taking the antilogarithm of a coefficient one can get also a more quantitative impression of the importance of a determinant. The antilogarithm of  $\beta$ ,  $\exp \beta$ , is an estimate of the odds ratio (OR)<sup>14</sup>. This measure is the ratio of the relative occurrence (odds) of that determinant in the two groups.

Our model included smoking, obesity and the socio-demographic determinants: sex, age, civil status, family size, degree of urbanization, education, occupation and familial social class. Sedentary living can be an effect modifier in studying the association between leisure time physical activity and these determinants: those who are employed in active jobs might be less physical active in leisure time. To adjust for such an interfering effect sedentary living was also included in the model.

## Results

One third (31 per cent) of the study population was predominantly sedentary during day-time; in the evening this was 85 per cent. Regular walking was done by 62 per cent of the subjects, cycling by 33 per cent and sports by 29 per cent (Table 1). This table also shows the range of the time spent on each of these activities. The inactive and active group as defined in the methods section included respectively 44 and 14 per cent of the study population. About two third of the inactive group (65 per cent) and 80 per cent of the active group thought they had a satisfactory physical activity pattern.

The results of the target group segmentation on physical inactivity in leisure time are given in Table 2. By means of the discriminant function coefficients, odds ratios ( $OR = \exp \beta$ ) were derived. An OR of 1 means that the relative occurrence (odds) of a determinant was similar in the two groups. OR greater than 1 indicate that the determinant proportionally occurred more in the index group (the "inactive" group). Determinants with an OR value between 0 and 1 were relatively more frequent in the reference group (the "active" group). For instance, the odds ratio (OR) of 3.4 for the age category 55-64 years means that in this age group inactives were proportionally three and a half times more present compared to the 18-24 years age group. Less pronounced determinants were family size and education. The inactive (target) group also included more smokers. No relation could be found between leisure-time physical activity and sex, civil status, degree of urbanization, occupation, familial social class or body mass index. Apparently day-time activity level did not influence physical activity in leisure time ( $OR = 0.8$  for sedentary living).

Factors inhibiting the inactive group's intention to take more exercise are listed in Table 3. More than half did not intend to take more exercise in the near future. The differences in attitude towards physical activity

Table 1  
Percentiles of minutes per week spent  
on leisure time physical activities :  
walking, cycling and sports

study population (n = 1,951)				
	%	regular percentiles		
		10 th	50 th	90 th
walking	38	60	120	420
cycling	67	30	60	150
sports	71	45	90	240
inactive group (n = 856)				
	%	regular percentiles		
		10 th	50 th	90 th
walking	63	30	60	90
cycling	75	20	60	60
sports	87	30	60	60
active group (n = 263)				
	%	regular percentiles		
		10 th	50 th	90 th
walking	7	120	180	420
cycling	32	60	120	240
sports	27	60	120	300

between target and active group are demonstrated in the percentage agreement with the separate attitude items (Table 4).

The influence of the social environment in stimulating physical activity in the target group was limited. One in six (16 per cent) of the inactive group affirmed that influential others, mostly household members, sometimes made remarks on their sedentary mode of living. The majority of them, however, was not going to be bothered by that. Of the active group, 37 per cent reported regular attempts to motivate, household members and acquaintances to participate in more exercise. The majority judged such attempts to be fruitless.

## Discussion

Examination of studies dealing with leisure time physical activity revealed that the Netherlands, like other industrialized countries, has a predominantly sedentary population. Nevertheless, like in the United States, a new interest in exercise is developing. This trend is deducible from the 28 per cent increase in the sale of bicycles<sup>15</sup> and the growing participation in jogging and organized sports<sup>16</sup>, during the last five years. There is still an important part of the population,

Table 2

**Target group segmentation on physical inactivity in leisure time.  
Comparison of the inactive (n=856) with the active group (n=263) by linear discriminant analysis.**

determinant	categories vs. (reference)	discriminant coefficient $\beta$	odds ratio exp $\beta$
sedentary living	> 8 hrs/day sedentary activities vs. (all others)	-0.1894	0.8
sex	men vs. (women)	-0.0154	1.0
age	25-34 years	0.0164	1.0
	35-44	0.4010	1.5
	45-54	0.5579	1.7
	55-64 vs. (18-24)	1.2321*	3.4
civil status	married	-0.1517	0.9
	divorced/widowed vs. (unmarried)	0.1169	1.1
family size	5 or more members vs. (1-4 members)	0.5506*	1.7
degree of urbanization	urban vs. (rural)	0.1325	1.1
education	primary school/low vocational training vs. (higher education)	0.5849*	1.8
occupation	blue and lower white collar workers vs. (all others)	0.0487	1.0
familial social class	lower class vs. (all others)	0.2779	1.3
body mass index	obese vs. (non obese)	0.1165	1.1
smoking	smoker vs. (non smoker)	0.5170*	1.7

\* significant at .05 level.

however, to whom the idea of exertion does not appeal. Identification of this category within the heterogeneous population is referred to as target group segmentation. The objective of such segmentation is to direct health education more specifically and, thereby, perhaps more effectively to a target group. For optimal communication, a socio-demographic description is just as crucial as knowledge of the personal needs, preferences and attitudes of the group.

If the aim is to promote physical exercise the target group segmentation indicates that we have to focus on older people, on large families and on individuals with a low level of education. Similar determinants of inactivity have been reported elsewhere. In an industrial setting<sup>8</sup> it was observed that those who did not enter a physical fitness programme were older and had higher levels of cardiovascular risk indicators, like smoking. A positive association between obesity and

inactivity<sup>10</sup> was not found in our study. Our findings are not applicable for a homogeneous target group. The determinant large family size is not coherent with the age group 55-64 years since in this age category usually children do no longer belong to the household. Apparently in our target group two dimensions can be discerned : older people as such, and in the younger age groups the large families. Lower educational attainment and smoking are applicable for the entire target group.

Interpretation of the results requires consideration of the validity of information obtained through questionnaires, i.e. the likelihood of imprecise reporting of actual activity performed, and hence, misclassification of subjects. A subjective measure based on a recall of daily activities seems to be the only known practical method for quantifying activity on a population basis.

For our segmentation purposes we assumed



*Exercise is recommended at all age (Photo WHO)*

measurement of physical activity on an ordinal scale to be sufficient. Observation bias would only lead to an underestimation of the contrast between actives and inactives, i.e. less pronounced odds ratios. Moreover realizing these shortcomings, we restricted the discriminant analysis to the extremes of the scale of leisure time physical activity. An improvement would have been, to take into account other recreational activities such as gardening and more detailed information on occupational activities.

In stimulating physical activity, health education should concentrate on participation and adherence<sup>1</sup>, presupposing that opportunities for exercise are available. In the Netherlands numerous facilities for recreation are available. Haskell and Blair<sup>9</sup> found that factors such as the organization and leadership of the programme, types of activities offered, convenience of participation, and social support that is generated may be important in promoting programme adherence over time.

To induce participation, education about the benefits of physical activity and motivation to engage in exertion are two major tools. The target group mentioned "enough activity" as the predominant reason for not planning more exercise in the near future (Table 3). This is perhaps related to the fact that the concept of

Table 3  
Factors inhibiting the intention to take more exercise in the inactive group  
(target group, n=856)

Do you intend to take more exercise in the near future ?		
	percentage	
yes	26	
not sure	18	
no	56	
What are the reasons ?		
	percentage	
enough activity	45	
not motivated	19	
no time	18	
health reasons	12	
none	3	
weather conditions	2	
other factors	1	
		100

exercise carries a different meaning for each individual, leading to different reactions : based on their concept of exercise, persons may conclude that they are already active or fit, and therefore, need not give additional attention to this issue. Though there is no consensus of opinion in the literature on type, frequency, intensity, and duration of exertion required for a protective effect<sup>4,17</sup>, programme makers should take into account inter-individual variation in the meaning of, and the response to physical activity and exercise.

Motivation can be internal as well as external. A major part of the target group reported to feel no internal motivation for more exercise. This is also reflected in their attitude (Table 4). Heinzelmann<sup>18</sup> stated that motivation to participate in exercise programmes may be due to various reasons such as health, recreation or relaxation, opportunities for social contacts or factors related to personal image and self-esteem.

Therefore in promoting participation, the focus should be diverse and a variety of motives should be taken into consideration whether or not they are health-related.

Stimulation from relevant others in the social environment, external motivation, was perceived by both the target and active group, as being of not much help. In other reports<sup>18</sup> the impact of the social network is highly valued. Perhaps this depends on the level of internal motivation : when internal motivation exceeds a threshold value, the influence of the social environment may result in a greater effect.

To conclude we may state that, exercise promoting programmes should focus on older people as well as large families in the lower socioeconomic strata, with emphasis on attitude change to stimulate internal motivation.

Table 4  
Attitude towards physical activity by the inactivity by the inactive (target) and active group

	percentage agreement	
	inactive group (n=856)	active group (n=263)
Easy does it, so why should I bother to cycle or to walk when there are other ways	27	9
Exercise makes you feel fitter	81	93
Exercise is a good way to relax	82	93
I often do not feel like doing exercise	49	25
Exercise takes too much effort	31	10
I simply like doing exercise	52	85

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### Resumen

Los ejercicios físicos disminuyen el índice de lípidos en la sangre y permiten luchar contra obesidad e hipertensión. El ejercicio favorece la responsabilidad en los problemas de salud, que se manifiesta a menudo con un consumo menor de cigarrillos y una mejor condición física.

Los autores analizan los resultados de una investigación realizada en los Países-Bajos para distinguir a los activos de los sedentarios. 60 minutos por semana dedicados al deporte, 75 a la bicicleta y 90 a la marcha fueron los criterios retenidos para diferenciar a las

personas activas.

Los resultados muestran que el 62 por ciento de los individuos contactados practican la marcha, el 33 por ciento la bicicleta y el 29 por ciento un deporte.

El estudio pone en evidencia que la población de los Países-Bajos así como la de la mayoría de los países industrializados es sedentaria. Un interés reciente por el deporte se nota nonostante. Habría que elaborar programas de ejercicios físicos sobre todo con destino a las personas mayores y familias numerosas en grupos desfavorecidos.

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### Résumé

L'exercice physique diminue le taux de lipides dans le sang et permet de lutter contre l'obésité et l'hypertension. L'exercice favorise aussi une prise de conscience des problèmes de la santé, qui se traduit souvent par une moindre consommation de cigarettes et une meilleure condition physique.

Les auteurs analysent les résultats d'une enquête menée au Pays-Bas pour distinguer les actifs des sédentaires. Soixante minutes par semaine consacrées au sport, soixante-quinze minutes de vélo et quarante-dix minutes de marche ont servi de critère pour différencier les personnes physiquement actives de

personnes inactives.

Les résultats ont montré que 62 pour cent des individus interrogés faisaient de la marche, 33 pour cent du vélo et 29 pour cent du sport.

L'étude met en évidence que la population des Pays-Bas, comme celle de la plupart des pays industrialisés, est principalement sédentaire. Un intérêt récent pour le sport y est cependant perceptible. Des programmes d'exercices physiques devraient être mis au point surtout pour les personnes âgées et les familles nombreuses dans les groupes défavorisés.