Parity and obesity

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SUMMARY Parity was found to be closely related to adiposity and prevalence of obesity in a population sample of 17 688 non-pregnant women aged 25–84. The women took part in multiphasic screening examinations in various parts of Finland in 1966–72. The relationship between parity and obesity was independent of other factors such as geographical area, region, marital status, occupation, smoking habits, or incapacity for work. Pregnant women were considered to be an important target population for nutritional education.

It is a common experience that the excess deposit of fat acquired during childbearing tends to remain for a long time after delivery. Parity may thus be an important determinant of obesity. We report here an association of parity with adiposity and prevalence of overweight in a large sample of Finnish women.

Material and methods

In 1966–72 the Social Insurance Institution's mobile clinic carried out multiphasic screening examinations in 31 population groups in different parts of Finland.[1] The main emphasis was on examinations for cardiovascular diseases and their risk factors. Altogether 56 000 persons aged 15 or over were examined. The overall participation rate was 82%. All the 17 688 non-pregnant women aged 25–84 were included in the present study.

As part of the examination, weight and height were measured. Obesity was defined as a Quetelet's index (weight/height^2) of 30 kg/m^2 or more. Other data were collected by a questionnaire, which was checked by a specially trained nurse. Parity was classified according to the total number of births by the time of the examination.

Because both parity and prevalence of obesity were strongly age-dependent even within the 10-year age groups, age-adjustment between the categories of parity was performed by analysis of covariance.

Possible confounding by other factors was studied by analysis of covariance. The following variables were included: age (continuum); marital status (four groups); geographical area (six areas); region (rural, urban); occupation (nine groups)[2]; smoking (never, stopped, current smokers); capacity for work (capable, incapable); and parity (0, 1–2, 3–5, 6–9, 10 or more births).

Results

Average adiposity, as reflected by Quetelet's index, increased consistently with parity (Table 1). This increase was strongest among the youngest women, aged 25–34, but varied only little between the other age groups. In total, the women with 10 or more previous childbirths were on average 2·3 kg/m^2 heavier than the women with no births. Accordingly, parity was closely related to the prevalence of obesity (Table 2). The relationship was relatively most pronounced in the youngest age groups in which obesity was rarest, but it was still observed among the women aged 75–84. The variation of age-adjusted prevalence of obesity between the categories of parity was statistically highly significant (p <0·001, F-test) in every age group.

In the analysis of covariance, the associations of parity with Quetelet's index and prevalence of obesity were not found to be essentially confounded by geographical area, region, marital status, occupation, smoking habits, or capacity for work (Table 3). In addition to age, only occupation was confounded with parity. This was mainly due to high parity and increased frequency of obesity among the women working in agriculture.

All the variables obtained in the analysis of covariance were together able to explain 18·3% (R = 0·428) of the total variation of Quetelet's index and 9·4% (R = 0·307) of prevalence of obesity. Age was the most powerful of the individual factors (partial r = 0·270 to explain Quetelet's index and partial r = 0·167 to explain the prevalence of obesity). Parity was after age the next most powerful explanatory factor, even though the partial correlation coefficients, 0·104 and 0·079 respectively, were rather small. This indicates that

Table 1 Age-adjusted* mean value of Quetelet's index (kg/m²) according to parity and age group among 17 688 Finnish women. (Number of subjects in brackets)

No. of births	AGE GROUPS (years)						Total
	25–34	35–44	45–54	55–64	65–74	75–84	
0	22·9 (917)	24·8 (611)	26·3 (614)	27·4 (622)	27·4 (411)	26·4 (95)	25·4 (3 270)
1–2	23·3 (2260)	25·2 (1598)	26·8 (1203)	27·8 (951)	27·8 (493)	26·7 (113)	25·8 (6 618)
3–5	24·1 (897)	25·8 (1673)	27·6 (1477)	28·4 (1065)	28·6 (525)	26·9 (142)	26·7 (5 779)
6–9	26·6 (45)	26·9 (323)	28·4 (509)	28·7 (452)	29·1 (293)	25·7 (78)	27·3 (1 700)
10+	33·1 (1)	26·8 (24)	28·9 (84)	29·2 (124)	29·0 (62)	29·4 (26)	27·7 (321)
Total	23·4 (4120)	25·5 (4229)	27·3 (3887)	28·1 (3214)	28·2 (1784)	26·7 (454)	26·2 (17 688)
F (4; ∞)	22·2	22·8	24·9	9·0	8·9	3·4	104·8
	p <0·001	p <0·001	p <0·001	p <0·001	p <0·001	p <0·01	p <0·001

*Analysis of covariance, age as a continuous variable

Table 1 Age-adjusted* prevalence(%) of obesity according to parity and age group among 17 688 Finnish women. (Number of subjects in brackets)

No. of births	AGE GROUPS (years)						Total
	25–34	35–44	45–54	55–64	65–74	75–84	
0	4·0 (917)	9·0 (611)	16·1 (614)	27·3 (622)	29·8 (411)	15·5 (95)	15·1 (3 270)
1–2	3·9 (2260)	9·2 (1598)	20·8 (1203)	27·7 (951)	29·6 (493)	19·5 (113)	16·1 (6 618)
3–5	6·1 (897)	13·3 (1673)	25·9 (1477)	34·7 (1065)	39·0 (525)	24·5 (142)	21·3 (5 779)
6–9	21·6 (45)	20·8 (323)	32·7 (509)	37·0 (452)	42·2 (293)	17·5 (78)	27·3 (1 700)
10+	100 (1)	22·3 (24)	43·1 (84)	39·5 (124)	39·2 (62)	52·8 (26)	32·7 (321)
Total	4·6 (4120)	11·8 (4229)	24·0 (3887)	31·7 (3214)	34·8 (1784)	21·8 (454)	19·0 (17 688)
F (4; ∞)	11·4	11·7	17·5	6·7	5·6	4·8	51·9
	p <0·001	p <0·001	p <0·001	p <0·001	p <0·001	p <0·001	p <0·001

*Analysis of covariance, age as a continuous variable.

Table 3 Partial correlation (r) of parity to Quetelet's index and prevalence of obesity in stepwise multiple analysis of covariance

Variables allowed	Quetelet's index		Prevalence of obesity	
	r	F (4; ∞)	r	F (4; ∞)
Age	0·154	103·9 p <0·001	0·109	51·9 p <0·001
Age, occupation	0·125	67·9 p <0·001	0·088	33·5 p <0·001
Age, occupation, area, region, marital status, smoking, capacity for work	0·104	46·3 p <0·001	0·079	26·9 p <0·001

parity is indeed one factor among many others which determine adiposity and frequency of obesity in the population.

Discussion

The relationship between parity and obesity has not been examined in detail in previous population studies, although a positive correlation between weight index and number of children has been observed.[3] In addition, the associations of parity with such obesity-related diseases as adult-onset diabetes,[4] hypertension,[5] and gall stones[6] have been 'explained' by obesity. The association between parity and body weight seems not to be due to the effect of heredity[7] or socioeconomic status.[3]

Our finding of a close association between parity and prevalence of obesity in the general population may be important for intervention programmes attempting to control adiposity. Pregnant women are

an important target population for nutritional education because of their increased risk of obesity, and also because women largely determine the nutritional habits of their families.

In future research on obesity, hypotheses arising from its relationship with parity may prove valuable. Multiparous women may have gained weight as a result of their increased food intake, reduced physical activity, or both. On the other hand, the effect of possible persistent changes in endocrine functions should also be considered.

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References

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