naire was used. We checked the validity of this shortened scale by applying it together with the Jenkins activity survey type A scale in another sample of 99 men in the same area. The Spearman correlation coefficient between the two scores within the same men was $r=0.43$, which is closely similar to correlations¹ using the full Framingham and Jenkins activity survey scales. Secondly, angina was diagnosed only by questionnaire. While any questionnaire may produce some false positive diagnoses, the one used in this study does predict mortality from ischaemic heart disease.³ Thirdly, unemployed men were excluded. Certainly employed and unemployed groups cannot be assumed to be comparable, but how this problem has been treated previously is not clear. As most type A instruments refer frequently to work, and the behaviour pattern is believed to occur mostly at work, the validity of type A measurements in the unemployed must be questioned.

A further limitation, which arises in all cross sectional studies of ischaemic heart disease, is that subjects with evidence of disease represent survivors. This raises the problem of interpreting the observed relation of type A solely with angina. Although the number of infarcts recorded was small ($n=10$), the number of subjects with electrocardiographic evidence of ischaemia was considerable ($n=65$), and neither showed a relation with type A behaviour. Although studies in the United States¹ have disclosed an association with electrocardio-

graphic evidence of ischaemia as well as infarction and angina, our findings are consistent with those of other European studies.^{4,5} It may be that the experience of angina increases awareness of ischaemic heart disease and inflates the type A score. Clearly this issue can be settled only by prospective data.

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Haemoglobin A_{1c} concentrations in men and women with diabetes

Measurement of glycosylated haemoglobin HbA_{1c} concentrations is becoming more common in diabetic clinics as an assessment of long term blood glucose control. We therefore report a recent study in a large diabetic clinic population in which we observed a significant difference in concentrations of HbA_{1c} between men and women.

Subjects, methods, and results

The study population comprised 909 diabetics (430 men, 479 women) and 70 non-diabetic patients (35 men, 35 women). HbA_{1c} concentrations were measured by isoelectric focusing,¹ which gave an interassay coefficient of variation of 3.0% and an intra-assay coefficient of variation of 2.6%. Results

adopting "acceptable" values in assessing long term blood glucose control. Other workers have also suggested that there may be a difference in HbA_{1c} values between men and women diabetic patients, but numbers were small and there was no indication of the blood glucose concentrations at the time.²

The reason for this sex difference is not clear. As HbA_{1c} values are expressed as a percentage of the total haemoglobin concentration of the sample, the known sex difference in total haemoglobin should not affect the result. Chronic blood loss—for example, menstruation—and the known sex difference in life span of erythrocytes (men 120 days, women 109 days) would be expected to reduce HbA_{1c} values in women patients rather than increase them. Subdividing men and women patients by other criteria—for example, treatment—had no effect on the result, and no significant difference in mean blood glucose concentrations was observed in any of the subgroups. This indicates that in general women diabetic patients do not have higher

HbA_{1c} and whole blood glucose concentrations in 979 diabetic and non-diabetic men and women. Results expressed as means (SD in parentheses)

	Men			Women		
	No	HbA _{1c} (%)	Whole blood glucose (mmol/l)	No	HbA _{1c} (%)	Whole blood glucose (mmol/l)
Diabetic patients	430	9.6 (1.82)*	9.7 (3.88)	479	10.5 (2.00)	9.9 (4.38)
Non-diabetic patients	35	6.6 (0.43)		35	6.4 (0.46)	
Aged 40 years or less	105	9.6 (1.66)*	9.9 (4.68)	98	11.1 (1.97)	10.0 (4.69)
Aged 50 years or more	268	9.6 (1.94)*	9.6 (3.54)	329	10.3 (2.02)	9.8 (4.25)
Patients receiving insulin	218	10.0 (1.75)*	10.3 (4.48)	227	11.0 (1.76)	10.6 (4.84)
Non-insulin requiring patients	212	9.3 (1.82)*	9.1 (3.03)	252	10.0 (2.09)	9.2 (3.81)

* Significantly different from value in women ($p<0.001$).

Conversion: SI to traditional units—Glucose: 1 mmol/l $\approx$ 18 mg/100 ml.

were expressed as a percentage of the total haemoglobin of the blood sample. Whole blood glucose was measured on a glucose analyser (Yellow Springs).

HbA_{1c} concentrations differed by roughly 9% between the men and women diabetic patients ($p<0.001$; see table). There was no significant difference in blood glucose concentrations between the sexes, however, nor was there a significant difference in HbA_{1c} values between non-diabetic men and women (table). The sex difference in HbA_{1c} values in the diabetic group was observed in patients both under 40 (when women might be expected to be menstruating) and over 50; and this difference was not affected by the type of anti-diabetic treatment given. HbA_{1c} values were also higher in the women diabetics irrespective of their body weight and blood glucose concentrations at the time of sampling.

Comment

These results draw attention to a difference in HbA_{1c} concentrations between diabetic men and women and the need for caution when

blood glucose concentrations than the men. This would suggest that "female" haemoglobin can undergo a greater degree of glycosylation compared with that of male diabetic patients at the same blood glucose concentrations, and experiments to test this hypothesis are in hand.

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