Joint effect of occupation and nationality on the prevalence of peptic ulcer in German workers

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ABSTRACT In Central Europe and in South Africa duodenal ulcer disease has been reported to occur twice as often in migrant workers as in the indigenous population. To investigate the reasons for this phenomenon the joint effect of occupation and nationality on the prevalence of gastric and duodenal ulcer was studied in a survey of 73 000 active members of the German workforce. Non-ulcer dyspepsia and gastric, but not duodenal, ulcer were found more frequently in migrant than in indigenous workers. Manual workers were more prone to develop gastric and duodenal ulcer and non-ulcer dyspepsia than sedentary workers. The seemingly increased prevalence of duodenal ulcer in migrant workers observed by other authors may be due to migrant workers being employed predominantly in manual labour which bears a twofold risk of developing duodenal ulcer.

In West Germany and in Switzerland duodenal ulcer disease has been reported to occur twice as often in migrant workers from southern Europe as in the native population.¹⁻⁴ A similar phenomenon has been observed in South Africa.⁵⁻⁷ Duodenal ulcer used to be rare in rural black communities but the number of Africans in the cities presenting with duodenal ulcers has steadily increased over the past 50 years. The reasons for this increase are unknown. It has been speculated that, being in a strange and sometimes hostile environment, migrant workers are more exposed to stress. The studies from Europe and South Africa were all based on endoscopy or surgery records of community hospitals. A fictitious increase in migrant workers could have resulted from them seeking primary care at hospitals rather than first presenting to a general practitioner or family doctor or being admitted to hospitals more readily than the indigenous population. It has also been claimed that people from southern Europe may have a different attitude to bearing pain and may be more hypochondriacal, thus being more likely to have their ulcers detected. To circumvent the disadvantages of hospital or endoscopy records, the prevalence of peptic ulcer disease in healthy and active members of the German workforce was studied.

Methods

According to the German system of social security and German legislation regarding occupational health, companies and workshops located in West Germany are likely to have their employees subjected to medical check ups. The "Technische Überwachungs-Verein Rheinland" (TÜV) is a non-profit making organisation specialising in this field. It conducts about 37 000 medical examinations annually of employees, mostly from the county of North-rhine. Those examined belong to the workforce and are considered healthy at the time of the examination. This means that in most instances they are not subjected to the examinations because of any complaints but rather because the legal regulations concerning their employment ask for this examination to be scheduled at specified time intervals. Every examination consists of taking a history, a physical examination, and blood tests. If any of these disclose a pathological finding, the employee is subjected to additional tests, unless the complaints or the findings had already been attached to a specific diagnosis in the past. In the case of peptic ulcer disease this diagnosis was most often checked on the form because previous reports of upper gastrointestinal endoscopy or x ray films had verified this diagnosis. Only in a few cases was the diagnosis established for the first time due to symptoms presented at the TÜV medical examination. For every patient a form was completed and the information fed into a computer. In addition to the diagnoses the form contained information

Table 1 Distribution of the 73 615 employees

Type of occupation	Nationality	Sex	Age	Gastric ulcer	Duodenal ulcer	Non-ulcer dyspepsia	Non-ulcer
Manual	Migrant	F	-30	0	0	13	457
		F	-50	9	2	21	1279
		F	≥50	2	1	3	160
		M	-30	5	1	27	1498
		M	-50	37	23	117	3443
		M	≥50	5	10	14	607
	Indigenous	F	-30	3	4	22	3644
		F	-50	10	14	28	3140
		F	≥50	8	4	9	1543
		M	-30	28	24	70	10346
		M	-50	111	73	160	14179
		M	≥50	67	53	79	6206
Sedentary	Migrant	F	-30	0	0	1	102
		F	-50	2	1	7	174
		F	≥50	0	0	0	29
		M	-30	0	0	3	280
		M	-50	8	2	20	824
		M	≥50	1	0	4	122
	Indigenous	F	-30	7	3	18	3929
		F	-50	4	4	8	3153
		F	≥50	2	1	2	957
		M	-30	8	4	20	4214
		M	-50	37	24	44	8598
		M	≥50	24	16	22	3377

about the employee's nationality, age, sex, occupation, and type of company. The information was recorded by TÜV in such a manner that subjects could not be identified, directly or through identifiers linked to the subjects. Accumulated data and statistical analyses, but no data on the individual employee, could be retrieved.

The present analysis was based on all subjects examined from 2 January 1982 until 31 December 1983. The age, sex, and occupation specific numbers of migrant or indigenous employees with past or present diagnosis of gastric and duodenal ulcer, non-ulcer dyspepsia, or with none of these three diagnoses were evaluated (table 1). Originally the data were stored with a three digit code number for each occupation but since the number of cases in the 1000 individual occupations proved too small to allow use-

ful statistical analysis, the occupations were condensed to the two groups of either manual or sedentary workers.

In analysing the separate risks of contracting peptic ulcer associated with occupation, nationality, and sex, the odds ratios of manual versus sedentary occupation, migrant versus indigenous workers, and women versus men were calculated (table 2). In the calculation of each individual odds ratio the effect of age and the other confounding variables was controlled by the procedure of Mantel and Haenszel.⁸

Results

The records of 73 615 employees were evaluated and their distribution among the different categories is shown in table 1. The population of the present study

Table 2 Odds ratios (OR)

	OR-MH	Lower OR	Upper OR	CHI ² -MH	p-Value
Occupation: manual v sedentary					
Gastric ulcer	1.56	1.09	2.23	13.32	<0.001
Duodenal ulcer	2.03	1.42	2.90	21.51	<0.001
Non-ulcer dyspepsia	1.74	1.37	2.22	36.39	<0.001
Nationality: migrant v indigenous					
Gastric ulcer	1.42	0.89	2.27	6.16	<0.025
Duodenal ulcer	1.11	0.33	3.74	0.28	NS
Non-ulcer dyspepsia	2.94	2.53	3.42	183.67	<0.001
Sex: woman v man					
Gastric ulcer	0.47	0.33	0.67	22.70	<0.001
Duodenal ulcer	0.51	0.33	0.80	13.18	<0.001
Non-ulcer dyspepsia	0.72	0.51	1.01	10.98	<0.001

Odds ratios and chi² were calculated according to the method of Mantel and Haenszel (MH). Lower and upper OR correspond to the 95% confidence interval.

comprised (as compared with the total workforce in the Federal Republic of Germany⁹) 65% manual versus 35% sedentary occupations (FRG: 52% v 48%), 87% indigenous versus 13% migrant workers (FRG: 91% v 9%), and 74% men versus 26% women (FRG: 61% v 39%). Indigenous workers were employed about twice as often as migrant workers in sedentary occupations (38% v 17%, $\chi^2 = 1583$, $p < 0.001$).

The overall prevalence of gastric and duodenal ulcer was 0.51% and 0.36%, non-ulcer dyspepsia was reported in 0.97% of all subjects (table 1). The prevalence of gastric ulcer was 0.60% in manual and 0.36% in sedentary workers. The corresponding figures for duodenal ulcer were 0.44% and 0.21%. To control the confounding interaction of age, sex, nationality, and occupation the procedure of Mantel and Haenszel was used to calculate the odds ratio of each individual effect; the values are shown in table 2. After eliminating the confounding effects of the other variables, manual versus sedentary work was still associated with an increased risk for all three diagnoses. The association was significant for all three diagnoses, the risk of manual work being highest with respect to duodenal ulcer.

Gastric ulcer occurred in 0.74% of the migrant and in 0.48% of the indigenous workers. Duodenal ulcer occurred in 0.43% of the migrant and in 0.35% of the indigenous workers. In controlling for the other confounding variables, however, only the correlation between migration and gastric ulcer or non-ulcer dyspepsia, but not duodenal ulcer, proved statistically significant (table 2).

Male, as compared with female, sex was associated with a twofold risk of gastric and duodenal ulcer. This correlation between peptic ulcer disease and male sex was highly significant. Non-ulcer dyspepsia was observed in 0.70% of all women compared with 1.06% of all men. The odds ratio of female versus male non-ulcer dyspepsia was higher than that of gastric or duodenal ulcer. Although female non-ulcer dyspepsia was more common than female peptic ulcer disease, it was still significantly less than male non-ulcer dyspepsia.

Discussion

The population of the present study comprised active members of the German workforce who were considered healthy at the time of the medical interview. Analysis of the records of the employees subjected to medical check ups by occupational health authorities shows that gastric, but not duodenal, ulcer is more prevalent in migrant than in indigenous workers. This increased prevalence in migrant workers exists independently of the type of occupation. Manual workers are more prone to develop gastric and duodenal ulcer

than sedentary workers. Since migrant workers are predominantly employed in blue collar jobs associated with manual work, this leads to an additional increase in the prevalence of peptic ulcer observed in migrant workers. The seemingly increased prevalence of duodenal ulcer in migrant workers observed by other authors might be solely due to migrant workers being employed predominantly as manual workers which, according to the present data, bears a twofold risk of developing duodenal ulcer.

The diagnosis of non-ulcer dyspepsia was noted on the forms twice as often as either gastric or duodenal ulcer. With respect to its age, sex, and occupation specific distribution, this entity behaved in our population similarly to gastric and duodenal ulcer. Several studies of patients with ulcer like complaints have shown ulcer disease to develop in only one third of these patients.¹⁰⁻¹⁴ The similarities in its behaviour to peptic ulcer disease may indicate that, in our population, a larger fraction suffered from peptic ulcer, even though it was not demonstrable on x ray and upper gastrointestinal endoscopy. It could also indicate that similar environmental factors precipitate the risk of developing either peptic ulcer disease or non-ulcer dyspepsia.

Two additional studies have been performed to substantiate the association between occupational workload and prevalence of ulcer disease. Firstly, the Registrar General's decennial supplement from England and Wales and the vital statistics special reports of the United States Department of Health, Education, and Welfare on occupational mortality were analysed for occupation specific mortality of peptic ulcer.¹⁵⁻¹⁷ The statistics from both countries disclosed a high mortality of both types of ulcer among manual workers and a low mortality among sedentary occupations. In a second study the number of disability pensions granted to West German employees between 1979 and 1983 due to gastric and duodenal ulcers served as markers of peptic ulcer morbidity and were used to analyse the relation between occupation and prevalence of peptic ulcer disease.^{18,19} Both types of ulcer were more common among occupations associated with manual work than among sedentary occupations. In men there was a linear correlation between the energy expenditure of different occupations and the occurrence of duodenal ulcer, but not gastric ulcer. These findings are corroborated by the results of the present study using different material.

The relation between the risk of peptic ulcer and manual work described here may be important in our understanding of the aetiology of peptic ulcer disease. Industry has become highly mechanised during the past decades with a concomitant decrease in the amount of human labour.²⁰ The general decline of

duodenal ulcer in Europe and the United States during the past 20 to 30 years might be related to the general decline in the workload due to automation.²¹⁻²⁴ The relation between workload and duodenal ulcer partly explains why the disease affects men more often than women. The geographical distribution of duodenal ulcer and the pronounced difference between industrialised countries and Africa, for instance, might also be related to different grades of workload.²⁵ With respect to gastric ulcer and non-ulcer dyspepsia the risk of manual versus sedentary work does not account for all the difference observed between migrant and indigenous workers. Additional factors must be sought for precipitating the increased risk associated with migration. These factors could include different types of diet, smoking behaviour, and emotional stress.

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