SOCIAL MEDICINE STUDIES BASED ON CIVILIAN MEDICAL BOARD RECORDS

IV. OCCUPATIONAL AND PHYSICAL CHARACTERISTICS OF MEN WITH CERTAIN DIGESTIVE DISORDERS

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In a large sample of wartime Civilian Medical Board (C.M.B. *passim*) records it was found that 1·2 per cent. of the men examined were unfit for military service because of a peptic ulcer, and a further 0·25 per cent. because of other digestive disorders (Stewart, Webb, and Hewitt, 1955a). In addition to this loss of manpower at the screening stage there was a further heavy loss from the same causes among men accepted for military service: peptic ulcer ranked second only to psychiatric disorder as a reason for discharge from the army (War Office, 1948). Thus digestive disorders caused more serious disability than any of the other disease groups so far dealt with in this series (foot defects, varicosities, and skin diseases). In some ways this means that peptic ulcer is less suitable for study through massed medical records. The condition may, for example, make a patient lose weight or change his job, so that it becomes difficult, in a statistical analysis, to distinguish between cause and effect. Despite this difficulty it was felt that an analysis of the peptic ulcer records both by occupation and by physique could be of value, provided the results were interpreted with caution. To this study has been added a similar analysis of other types of dyspepsia and of appendicitis.

MATERIAL AND METHODS

The material and methods are the same as those described previously (Stewart and others, 1955b), and the Standardized Prevalence Ratios (S.P.Rs *passim*) make full allowance both for regional and age differences in recorded prevalence.

At the outset of the investigation it was arbitrarily decided to code as duodenal ulcers all those not specified as "gastric". It is estimated that, as a result, rather less than one-eighth of the so-called duodenal group may, in fact, have been gastric. In a small number of cases a man was recorded as having both a gastric and a duodenal ulcer, and such cases were counted in *both* the disease

groups. The label "Other Dyspepsia" covers all men recorded as complaining of indigestion in whom no specific cause was found; it excludes cases diagnosed as cholecystitis, colitis, or liver disease.

A history of appendicitis was coded only when an appendectomy scar had been noted at the examination.

PREVALENCE

AGE AND AREA.—The numbers of records of the four digestive disorders obtained from the three areas, together with crude prevalence rates per 1,000 are shown in Table I.

TABLE I
RECORDED PREVALENCE OF FOUR DIGESTIVE DISORDERS AMONG MEN EXAMINED AT THREE CIVILIAN MEDICAL BOARD CENTRES (1941-44)

Type of Disorder		Essex	Leicester	Northampton	Total
Gastric Ulcer	Number	45	157	53	255
	Rate per 1,000	3·8	6·8	3·4	5·0
Duodenal Ulcer	Number	120	257	130	507
	Rate per 1,000	10·0	11·1	8·2	10·0
Other Dyspepsia	Number	1,001	963	512	2,476
	Rate per 1,000	83·7	41·5	32·5	48·6
Appendicitis	Number	349	901	442	1,692
	Rate per 1,000	29·2	38·8	28·0	33·2

The recorded prevalence of peptic ulcer, even after allowing for age differences, was about 30 per cent. lower than that found by Doll, Jones, and Buckatzsch (1951). To some extent the discrepancy may be accounted for by geographical factors, since the male death rate from peptic ulcer (particularly gastric ulcer) is known to be well above average in Greater London, where most of the material used by Doll and others (1951) was collected (Registrar-General, 1951). The discrepancy may also be related to occupational differences; for example, the prevalence of ulcer in the relevant age-groups of the earlier enquiry would have been

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some 5 per cent. lower if, like the C.M.B. sample, it had not included any doctors. But the possibility must also be borne in mind that a considerable number of men with peptic ulcers may not have been included in the wartime "census of fitness for military service".* Although the prevalence rate of ulcers was lower than that previously recorded (Doll and others, 1951), the number of cases available for analysis was more than twice as great.

After standardizing for age there were no perceptible differences between the three regions in the recorded prevalence of duodenal ulcer, and no difference between Essex and Northampton with respect to gastric ulcer or appendicitis. Leicester had relatively high rates for both these conditions, which may indicate regional differences in morbidity. On the other hand, the apparent excess of dyspepsia cases in Essex is likely to be spurious, since this (less serious and less clearly defined) disease group clearly gave greater scope for personal differences between doctors, and Essex was known to have kept more comprehensive records than the other two areas.

All areas showed the expected age-distributions, namely, a continuous steep rise from the early twenties in the case of peptic ulcers, and other dyspepsia, and an approach to a "ceiling" prevalence at about the age of forty for appendicitis.

SOCIAL CLASS.—The main features of the social distribution of the four digestive disorders are shown in Table II.

For peptic ulcer as a whole there was a regular, though not statistically significant, gradient from a low level in Social Classes I and II to a high level in Social Class V. This gradient clearly had its origin in the gastric ulcers, which were more than twice as common in Social Class V as in Social Classes I and II. (No S.P.R. is shown in Table II because of the small numbers involved: eighteen cases recorded against 27.88 "standard" cases.) Since this excess was found in the social class for whom diagnostic opportunities are, reputedly, inferior, it seems likely to be genuine. By contrast with gastric ulcer, duodenal ulcer showed no social variation. This difference is similar to the result obtained by Doll and others (1951), whose site classification was more precise, and it tallies with the mortality figures of the last 35 years (Registrar-General, 1954). It therefore seemed justifiable, in the following occupational

analysis, to calculate S.P.R.s for the gastric and duodenal groups separately.

TABLE II
STANDARDIZED PREVALENCE RATIOS FOR FOUR
DIGESTIVE DISORDERS IN THE REGISTRAR-GENERAL'S
SOCIAL CLASSES

Social Class	Peptic Ulcer	Gastric Ulcer	Duodenal Ulcer	Other Dyspepsia	Appendicitis
I II	} 93	D†	107 {	115 91	129 123**
III	97	96	97	101	98
IV	109	99	115	101	106
V	115	153***	96	100	85*
χ^2 Degrees of Freedom	3.627	11.975	1.845	3.020	16.239
$P(\chi^2)$	> .30	< .01	> .50	> .50	< .01

† Less than twenty cases of gastric ulcer recorded in these classes.

In this and Tables III and IV, individual ratios are considered to differ significantly from 100 if the associated contribution to the sum of χ^2 would have been significantly large in a test based on 1 d.f. They are marked by asterisks as follows:

* $P < .05$; ** $P < .01$; *** $P < .01$; **** $P < .001$

No social variation could be detected in the prevalence of other dyspepsia, but appendicitis showed a definite gradient with the highest prevalence in Social Class I. Each of the three areas reproduced this excess in the upper classes. This finding is of particular interest since, as Table III shows, the variation seemed to be restricted to men over 30 years old in 1941 (*i.e.* men born before the first world war). It is just possible that there is a genuine age difference in the social distribution of appendicitis, like that previously found in the case of acne (Stewart and others, 1955c). An alternative explanation is that the distribution of cases among the older men was determined at a time when appendicitis was mainly an "upper class" diagnosis, and that it was not till later that the operation was more widely performed among the working classes. A similar change can be traced in American figures for tonsillectomy (Downes, 1954). But even if it is reasonable to suppose that the frequency of appendicectomy and tonsillectomy have been influenced by fashion, this can hardly explain recent changes in appendicitis

TABLE III
STANDARDIZED PREVALENCE RATIOS FOR APPENDICITIS
BY SOCIAL CLASS

* Social Class	Age Groups (yrs)	
	17-29	30-44
I and II	107	127****
III	97	98
IV and V	108	91
χ^2 for 2 d.f. $P(\chi^2)$	1.239 > .50	13.885 < .01

* Permanently disabled men (other than those certified as blind, mentally defective, insane, or permanently crippled by the loss of a limb) were subject to the National Service Registration Acts, but in practice some of them were not examined by C.M.B.s. It was, for instance, possible for a doctor's certificate of permanent disablement to be accepted in lieu of an examination and for no record to be kept of the case.

mortality. Thus in 1921 and 1931 appendicitis, as a cause of death, was more than twice as common in Social Class I as in Social Class V. By 1950 the difference had almost disappeared (Registrar-General, 1954). Taken together, the mortality and moribidity figures suggest that we are, in fact, dealing with an authentic example of the gradual spread through the whole population of a disease formerly restricted to the higher income groups.

OCCUPATION.—The principal findings of the occupational analysis are shown in Table IV.

TABLE IV
STANDARDIZED PREVALENCE RATIOS FOR FOUR
DIGESTIVE DISORDERS, BY OCCUPATION

Occupational Group	Peptic Ulcer	Gastric Ulcer†	Duodenal Ulcer	Other Dyspepsia	Appendicitis
Professional and Administrative	99	D	113	90	118
Commercial ..	101	101	101	94	108
Clerical ..	102	D	104	93	109
Boot and Shoe ..	83	94	78*	90	89
Textile ..	97	103	94	91	96
Metal Manufacture	116	D	131	107	104
Trade not defined†	97	D	97	116*	111
Warehouse ..	105	D	126	99	113
Transport ..	87	D	86	110	96
Building and Agriculture ..	75*	D	69*	98	81**
Unskilled ..	114	159***	92	106	81*
Other ..	128***	111	136***	105	115*
χ^2 for 11 d.f. ..	18·768	10·782	23·389	16·043	26·231
$P(\chi^2)$..	<·01	>·30	<·02	<·20	<·01

† Occupation as recorded common to several skilled trades (e.g. fitters, cutters, inspectors, etc.)

‡ The seven Occupational Groups marked D each yielded less than twenty records of gastric ulcer, the number recorded being in each case significantly less than the "standard" number.

For peptic ulcer as a whole the deviations from standard prevalence were of questionable significance, and those for gastric ulcer merely reflected the previous analysis by social class.

The results for duodenal ulcer, however, showed a definite association between occupation and prevalence. There were deficiencies of cases among builders, and among agricultural workers, which together yielded the lowest S.P.R. (69) shown in the table. "Boot and shoe" workers also had a significant deficiency of duodenal ulcers, which was found to originate in Northampton (occupational S.P.R. for Northampton alone, 66) rather than in Leicester (S.P.R. 96). But the largest departures from the standard prevalence of duodenal ulcer were in the heterogeneous group of "Other Occupations" which had a combined S.P.R. of 136. Subdivision of this group showed that the excess was concentrated in two small sub-groups, each of which had, a significantly high rate for both types of peptic ulcer:

(i) *Painters and Decorators* (Registrar-General's Main Order XV) had fifteen recorded cases of duodenal ulcer compared with a standard number of 6·85 (χ^2 with Yates' correction, 8·543; $P \approx 0·003$); 25 years ago, when "Painters and Decorators" had more deaths from occupational lead poisoning than any other group, they also had a high death rate from peptic ulcer (Registrar-General, 1938), but this was due to deaths from gastric rather than duodenal ulcer.

(ii) *Entertainments and Sport* (Registrar-General's Main Order XXI) yielded six cases of duodenal ulcer compared with a standard number of 1·81 ($P \approx 0·006^*$).

A third subdivision of the "Other Occupations" group in Table IV with an excess of duodenal ulcers was "Personal Service" (S.P.R. 139), but this could not be regarded as statistically significant.

The occupational analysis for "Other Dyspepsia", like the social class analysis, failed to show any significant variation, but there were some definite occupational differences in the prevalence of appendicitis. To some extent these may have been due to the social class gradient already discussed, but this can hardly explain the low S.P.R. of 81 for "Building and Agriculture". The "Agricultural" workers, whom one might have expected to have a low rate for appendicitis, in fact showed their full number of standard cases, and it was the "Builders" (S.P.R. of only 68) who brought down the rate for the combined group. As in the case of duodenal ulcer the most interesting departures from standard prevalence of appendicitis were in the smaller occupations making up the "Other Occupations" group in Table IV. Two definitely high rates were for "Personal Service" (S.P.R. 165, $P \approx \cdot01$), and for "Entertainments and Sport" (eight cases, compared with a standard number of 2·41, $P \approx \cdot002$). The rate for "Painters and Decorators" was again suggestively high.

PHYSIQUE AND PEPTIC ULCER.—S.P.R.s for gastric and duodenal ulcer, taken separately and together in relation to height, weight, and body build, were calculated by the method previously described (Stewart and others, 1955b). All the results are plotted together in the Figure (overleaf), the measurements for height, weight, and body build being expressed in standard deviations above and below the mean. Because of missing measurements the number of cases was about 100 less than in the previous section. The greatest range of variation was found among the weight groups. Thus peptic ulcers were

* When the standard number of cases was very small the probability was estimated by summing terms of the appropriate Poisson distribution and making the usual correction for continuity.

twice as common among men weighing less than 110 lb. as among those who weighed 150 lb. or more. However, this wide contrast in prevalence corresponds to a very small difference between the *average* weight of the ulcer subjects and that of a group of controls matched for region and age (4.35 lb. for duodenal ulcers alone, 4.78 lb. for gastric ulcers). A difference of this magnitude might easily be a residual effect of the illness rather than an indication that ulcer subjects are, initially, below average in weight. Similar considerations apply to the relatively high prevalence of ulcer among men who, as judged by the index $Ht \div \sqrt[3]{Wt}$, were light for their height. It was of interest here to find a strong similarity between the distribution of the two ulcer groups. This is illustrated by Table V in which the S.P.R.s for each extreme of the $Ht \div \sqrt[3]{Wt}$ scale are compared (these extremes correspond to the highest and lowest pairs of points shown in the Figure).

TABLE V

Build	Gastric Ulcer	Duodenal Ulcer
Slender Extreme ..	149.8	134.0
Stocky Extreme ..	77.5	69.2
Ratio Slender Stocky ..	1.93	1.94

One might have been tempted to infer from such a degree of similarity that the gastric and duodenal groups had not been adequately separated in the original coding, were it not for the fact that the two diseases had already been shown to differ in their social distribution. If, as seems likely, the tendency to be underweight is merely the result of having an ulcer, there would of course be no reason to expect a difference between the two groups.

The observed variation along the height scale, though it did not reach the same high level of statistical significance as that for weight and body build, is difficult to explain. There appears to be a minimum prevalence towards the middle of the scale, both short men and tall men being more liable than those just above average height. This finding is principally due to the height distribution of the men with *duodenal* ulcers and would have been overlooked if the analysis had been conducted solely in terms of average measurements.

DISCUSSION

Clinical teaching has long favoured a picture of the peptic ulcer patient as the paradigm of asthenic physique, in sharp contrast with the gallbladder patient who is taken to represent the pyknic, or stocky type of build. But evidence for the first of these views is neither as extensive nor as unanimous as is generally believed. The authorities on constitutional medicine most widely quoted are Kretschmer (1944), Draper (1930), Sheldon, Stevens, and Tucker (1940), and Sheldon, Hartl, and McDermott (1949), whose studies in the field of peptic ulceration seem to have three features in common:

(i) Their observations on ulcer patients are not adequately controlled by parallel observations on typical, healthy persons;

(ii) They do not consider that any peculiarity in the appearance or measurements of the ulcer subjects could be a *result* of illness;

(iii) Their clinical series do not run to much over 100 cases (compared with more than 600 in the present study).

Kretschmer (1944) using a method of physique classification that is in essence subjective, reported that 71 per cent. of 59 stomach ulcer patients were of the "leptosomic" (slender) type, compared with 38 per cent. of 1,000 other surgical patients. On the other hand, in one of Draper's earlier studies it is admitted that, although the gastric ulcer male differs widely from representatives of other disease groups, he shows only a "very slight divergence from the form of the general population" (Draper, 1930). In a later work gastric and duodenal ulcer patients are

said to possess very similar physical characteristics, and, although slightly above the average of a hospital series in stature, they are said to be 3.75-4.75 kg. (8½-10½ lb.) lighter in body weight (Draper, Dupertuis, and Caughey, 1944). The sample of duodenal ulcer patients studied by Sheldon and others (1949) was found to contain a preponderance of endomorphic—mesomorphs (*i.e.*, persons whose principal physical characteristic was muscularity), but so were the other disease groups studied at the Presbyterian Hospital, New York, and it is left an open question whether the duodenal subjects really differed in physique from the population from which this hospital drew its patients (Sheldon, Hartl, and McDermott, 1949). As against Draper and his group, Sheldon and his colleagues are confident that gastric ulcer patients can be distinguished from duodenal ulcer patients by an absence of gynandromorphy, a finding which is "so consistent that it is almost possible to predict the location of the lesion from a careful examination of the physique" (Sheldon, Stevens, and Tucker, 1940).

In the present study it has not been possible to attempt the detailed characterization of physique practised by these authors. Our figures confirm the clinical impression that men who have already developed a peptic ulcer tend to be thinner than other men, and show that they have an unusual height distribution which cannot be interpreted as an effect either of their illness or of treatment. But, taken together with the other evidence, our results suggest that the relevance of physical type to the ulcer diathesis has been exaggerated. The aetiological significance of "ulcer personality" has also been called into question by Kellock (1951) who failed to find any difference between the childhood histories of 250 duodenal ulcer patients and a control group of patients with other diagnoses.

SUMMARY

An analysis has been made of the social class and occupational distribution of men, who, at the time of their pre-service medical examination, had a peptic ulcer, complained of dyspepsia, or exhibited an appendicectomy scar. Amongst the previous findings confirmed by this study were an excess of gastric ulcer in the poorer classes and a comparatively

even social class prevalence of duodenal ulcers. A clear excess of peptic ulcers was noted among "Painters and Decorators" and among workers in "Entertainment and Sport." A relatively low prevalence of duodenal ulcer was found among "Boot and Shoe" factory workers and among workers in "Building and Agriculture."

For men born before the first world war, but not for younger men, there was a clear association between appendicectomy and membership of the well-to-do classes. Builders had a low rate for appendicitis, but there was a definite excess of patients with this disease among workers in "Entertainment and Sport" and in "Personal Service".

The prevalence of peptic ulcer was also examined in relation to height, weight and the body build index $Ht \div \sqrt[3]{Wt}$. Although men who had developed an ulcer were found to be somewhat underweight, the results do not prove that any particular type of body build is associated with liability to peptic ulcer. On the other hand the unusual height distribution of duodenal ulcer subjects seems to require explanation. Some previous work in this field is discussed.

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