A database on dyspepsia

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Abstract

A prospective study of dyspepsia was carried out in a primary referral hospital between 1974-1987 including 1540 patients of whom 1433 were seen as outpatients. The study protocol was agreed in advance and a structured questionnaire was used to elicit relevant clinical information: up to three diagnoses were permitted for each patient. The commonest principal diagnoses were duodenal ulcer (26%), functional dyspepsia (22%), and irritable bowel syndrome (IBS) (15%); alcohol related dyspepsia (4%) was as common as gastric carcinoma or symptomatic gall stones. Multiple diagnoses were common (31% given two diagnoses, and 6% given three) so that in all 2111 diagnoses were given to 1540 patients; the functional disorders (IBS and functional dyspepsia) considered together accounted for 39% of all diagnoses made. Whereas organic conditions were diagnosed by clinicians with confidence (63-98% considered 'certain'), even when given as the principal or first diagnosis IBS was considered 'certain' in only 61% and functional dyspepsia 48%. The demographic symptom data, together with information on tobacco and alcohol use, and work lost are described in detail.

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Although it is universally a common clinical problem dyspepsia, it is said, often defeats diagnosis.¹ Diagnostic uncertainty may lead to inappropriate investigation, such that the escalating demands on endoscopic services threaten to outstrip the resources available to readily meet them.² It has been suggested that a reassessment of dyspepsia is required, with more clinical and less technological input² and that a new database on dyspepsia is required.¹

We had come to rather similar conclusions in 1974 when we realised that the body of information then available was not sufficient for our proposal to develop a diagnostic decision system for dyspepsia. Accordingly we undertook a prospective study of dyspepsia with two main objectives in mind. The first objective was to develop a database for dyspepsia by carefully recording the symptoms and clinical features of the common causes of dyspepsia as well as their distribution between diseases. The second objective was to discover if such carefully collected data could be used to discriminate between different causes of dyspepsia. This paper considers our first objective and presents the characteristics of the patient population sampled and the main clinical features of the conditions encountered as well as the sometimes novel methods used.

The study carried out according to a

predetermined protocol included 1540 patients seen between 1974 and 1987 and used a structured questionnaire to elicit relevant clinical information from all patients who met our definition of dyspepsia.

The Southern General Hospital serves a population of about 150 000 and functions both as one of the five teaching hospitals associated with the Glasgow University Medical School as well as a district general hospital.

Although there seems to be no generally accepted definition of 'dyspepsia', the term itself seems to be widely used as a code word or shorthand description for a variety of symptoms implicitly attributed to disorders of the upper alimentary tract that may or may not be food related³; they include abdominal pain/discomfort, heartburn or other manifestations of gastro-oesophageal reflux, anorexia, nausea and vomiting, flatulence or air eructation (belching, burping or aerophagy), early satiety or undue repletion after meals, abdominal distension or 'bloating', and symptoms attributed by the patient to 'wind' or as Avery Jones has expressively put it, 'burbulence'.⁴

For our purposes, dyspepsia is defined as any form of 'episodic recurrent or persistent abdominal pain or discomfort, or any other symptoms referable to the upper alimentary tract, excluding bleeding or jaundice, of duration four weeks or longer'.^{3,5-7}

Methods

THE STUDY PROTOCOL

The study was prospective. The protocol included the definitions and classifications of the diseases to be studied, the investigations to be performed, the diagnostic criteria to be adopted, definitions of the symptoms and signs to be elicited, and standardised methods of eliciting them, and a questionnaire to be used for patient interviews. The protocol evolved from pilot studies, trials in the clinic, and regular meetings conducted over a 'run in' period of about 18 months before the project was started.

DISEASE CLASSIFICATION

A formal classification was adopted that provided a detailed classification for diagnosis as well as a shorter operational classification for the purposes of management. Table I gives the operational classification.

INVESTIGATIONS AND DIAGNOSTIC METHODS

Probability qualifications of diagnostic statements
We have attempted to quantify uncertainty by qualifying all important diagnostic statements

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TABLE 1 Operational classification

1	Simple oesophageal disease (OES simple); restricted to symptomatic reflux.
2	Severe oesophageal disease (OES severe); includes all other forms of oesophageal disease, for example, peptic oesophagitis, benign strictures, carcinoma, motility disorders, etc.
3	Gastric ulcer disease (GUD); includes gastric and prepyloric ulcer as well as scarring or deformity from either.
4	Duodenal ulcer disease (DUD); includes duodenal and pyloric channel ulcer as well as scarring or deformity from either and erosive duodenitis.
5	Gastric carcinoma (GCA).
6	Symptomatic cholelithiasis (CHOL).
7	Organic disease not otherwise specified (ORG) for example, pancreatic disease, diseases of small intestine including malabsorption states, diverticular disease of the colon, colon cancer, chronic inflammatory bowel disease, etc.
8	Irritable bowel syndrome (IBS).
9	Functional dyspepsia (FD); includes dyspeptic symptoms associated with a formal psychiatric diagnosis.
10	Alcohol related dyspepsia (ARD).
11	Other (OTH); includes 23 cases considered undiagnosable because of non-attendance for investigation or follow up, nine cases with referred abdominal pain or alimentary symptoms attributed to systemic disorder such as thyrotoxicosis, and four cases of gastritis (see text). Other serious medical conditions that were present but not considered directly relevant to the patients alimentary symptoms were noted separately for 114 patients (7%).

with a subjective probability to reflect the confidence or degree of certainty that they were correct, using a rank scale of 0 to 1·0; in this context a probability statement is merely a numerical estimate of the observer's belief or 'certainty' that his diagnostic opinion is correct. All clinical, endoscopic, and radiological diagnoses were qualified in this way. Probability judgements on final diagnosis were made by the responsible physician after investigation or follow up was considered adequate or surgical confirmation obtained.

Probability qualification of endoscopic and radiological findings

The findings to be recorded on endoscopic or radiological examinations were agreed in advance, and itemised on standardised forms, which required the observer to express a probability that his diagnosis as well as the findings (present/absent) on which it was made were correct.

Although all probabilities were recorded on a rank scale, it proved practical to reduce the scale to three classes for descriptive purposes – namely, 'certain' for probabilities equal to or greater than 0·9, 'probable' for probabilities between 0·7 and 0·9, and 'possible' for lesser probabilities.

General investigations

A total of 1540 patients were included in the study. In most a full blood count (1366), erythrocyte sedimentation rate (ESR) (1172), and test for faecal occult blood (1030) were carried out. A pentagastrin test of gastric secretion was carried out in the initial phase (363). Rigid sigmoidoscopy was performed in all patients with colonic disease including irritable bowel syndrome (IBS) (416); results were recorded on a standard form, and biopsy specimens were taken depending on findings. Other tests such as pancreatic function, lactose tolerance, and faecal fat output were done as seemed necessary. All radiological examinations were carried out by one observer (WBJ) and endoscopic examination by one of three (ADB, GPC, RJH). All barium examinations were double contrast.

DEFINITIONS AND DIAGNOSTIC CRITERIA

Diagnostic criteria were agreed in advance and applied as consistently as possible.

Oesophagitis, gastritis, and duodenitis were accepted as symptomatic disease classes according to the following endoscopic criteria. *Oesophagitis*: the presence of erosive, ulcerative or haemorrhagic changes, or both occurring independently of a frank ulcer. *Gastritis*: erosive, hypertrophic or haemorrhagic changes, or both independent of a frank ulcer. *Duodenitis*: erosive changes with or without hypertrophic/oedematous or haemorrhagic changes independent of a frank ulcer. Single lesions and 'simple' erythematous changes at any site were recorded but have been ignored for classification. In the event only four cases met our definition of gastritis as a symptomatic disease class and are included in the class 'other' in Table 1. The existence of *Helicobacter pylori* associated gastritis was not known when the study started and is not considered.

Oesophagitis, gastritis, and duodenitis as defined were considered certain, probable or possible according to the probability judgement of the endoscopist, irrespective of severity. Histological evidence alone was not sufficient for a 'certain' diagnosis but was used when available to fortify probable or possible diagnoses. The actual incidence of all three conditions is underestimated because not all subjects had an endoscopy.

Duodenal or gastric ulcer disease was considered certain, probable or possible according to the probabilities given by the endoscopist, radiologist or both for the presence of active ulcer, ulcer deformity or scarring.

'Certain' diagnosis of *gastric carcinoma* required histological proof.

Cholelithiasis – The presence of gall stones was diagnosed by imaging techniques, and qualified as certain, probable or possible according to radiological criteria, while the decision symptomatic or not was made on clinical grounds. Symptomatic gall stones was considered certain when the diagnosis had been confirmed and symptom relief had been obtained at surgery, and considered probable or possible on less persuasive evidence.

Other organic diseases of the gut or its appendages were diagnosed on commonly accepted clinical or investigative criteria, and given as certain, probable or possible after review of all available evidence. Histological proof was required for the diagnosis of malignant disease, and tissue diagnosis was pursued as far as possible in other organic diseases.

Functional disorders – no attempt was made to develop a consensus definition or to formulate explicit rules for the diagnosis of irritable bowel syndrome or functional dyspepsia. Diagnosis of these disorders was made by the individual physicians according to personal clinical opinion, supported to a greater or lesser extent by the exclusion of organic disease on investigation. While rigorous definition of the functional disorders would require that all possible organic disease had been excluded, this approach was considered unethical and investigations were pursued at discretion.

For irritable bowel syndrome barium enema examination was not normally required except in patients over age 40; sigmoidoscopy was always

carried out and lactose tolerance tests performed as necessary.

Functional dyspepsia includes all varieties of functional disorders seen, except what was confidently considered to be gastro-oesophageal reflux or IBS,⁸ the term as we use it being synonymous with non-ulcer, non-organic or nervous dyspepsia. Investigation of functional dyspepsia was limited to barium meal or endoscopy or both, and investigation of the biliary tree as seemed necessary.

A positive faecal occult blood test, and abnormal blood count, ESR or abnormal liver function tests were considered to exclude functional disorders unless convincingly accounted for otherwise.

The diagnosis of irritable bowel syndrome and functional dyspepsia were confirmed after follow up had been considered adequate and ranked certain, probable or possible according to the conviction of the responsible physician subject to peer review.

A formal *psychiatric diagnosis* required the opinion of one of three psychiatrists who worked closely with us, and were aware of our requirements. In the event 55 patients were given a certain psychiatric diagnosis as the principal or first diagnosis and are included in the class functional dyspepsia. Ninety eight other patients were given a psychiatric diagnosis as an additional second or third diagnosis. Psychiatric opinion was not sought for the less well defined psychological disturbances associated with functional alimentary disorders.

The diagnosis of *alcohol related dyspepsia* (alcohol abuse as the sole cause of symptoms) was difficult and based on self admission or an assessment of alcohol intake by a relative, on appropriate biochemical or haematological findings, raised blood alcohol concentrations on one or more clinic attendances and sometimes by liver biopsy or improvement of symptoms on alcohol withdrawal. The diagnosis was ranked certain, probable or possible in the opinion of the responsible physician on review of the evidence available from several clinic attendances. Alcohol abuse as a major or minor contributory factor in symptomatology was recorded separately (but not as a 'diagnosis') on similar but less persuasive evidence.

Data collection

SYMPTOMS AND SIGNS AS INDICANTS

The term 'indicant' as coined by Card and Good⁹ has been adapted as a convenient term to include any item of medical information – for example, signs, symptoms, the results of investigations, etc – that provides potential diagnostic evidence, so that the terms symptom, sign, indicant are used interchangeably here.

The indicants used in our study were chosen on arbitrary grounds because published works available provided little guidance on such criteria as the sensitivity, specificity, or error rates associated with the signs and symptoms relevant to the many potential causes of dyspepsia. The final choice was derived from our clinical experience, some personal 'hunches', and received

traditional wisdom; many were subjected to trial in the clinic before being adopted.

THE QUESTIONNAIRE

The questionnaire was administered by the physicians, and was used to elicit the history of the patient at first consultation. Because it had to take account of symptoms elicited by direct questioning as well as those proffered by the patient, the wording of questions designed to elicit symptoms was standardised and printed in the questionnaire. Experiments (unpublished) were carried out to test type I and II errors in recording specific symptoms as well as intra and interobserver agreement in eliciting them,¹⁰ Similarly the signs to be looked for, as well as standardised methods of eliciting them, were agreed after trial and error. Several drafts of the full questionnaire were tested before the final version was adopted.

The final questionnaire was designed as a coding form suitable for computerisation. Most items were recorded as present/absent. We have relied on the categorisation of 'never', 'rarely', or 'frequently' for the grading of some indicants, for example, heartburn and night pain; other indicants, for example, the duration or number of episodes of symptoms/year and the number of 'attacks' of pain, were recorded numerically.

The first version of the questionnaire (mark I) contained a maximum of 124 items and was used for about 1000 patients. A second version (mark II), used for the remaining patients contained a maximum of 164 items, omitting some items from mark I. In practice most patients were asked about half of all questions because of logical branching in the questionnaire depending on 'lead' symptoms; for example the 47 questions concerned with abdominal pain/discomfort were not asked if pain was absent.

Pain/discomfort was classified as 'episodic' (the pain has occurred daily for days or weeks at a time and disappeared to recur later), as 'attacks' (pains have occurred in isolated attacks which last at least 15 minutes) or as 'daily' (the pain is continuous or occurs daily or 'never leaves'), or as 'formerly episodic but now daily'. Although this classification was generally applicable, in some cases a more detailed version would have been desirable; in cases of doubt the physician chose a 'best fit' for the circumstances.

The physical signs to be recorded were defined in advance and included up to 10 sites for reference of pain or tenderness on palpation, as well as the presence of a palpable mass, liver or spleen and up to nine findings at sigmoidoscopy and blood pressure measurements. Anthropometric measurements (skin fold thicknesses, $n=1071$), and self reported psychological questionnaires (autonomic awareness scale, a short anxiety/depression questionnaire, and the Middlesex Hospital questionnaire, $n=1360$) were obtained, but are not considered further here.

Age, sex, height, weight, marital status and occupation, tobacco and alcohol consumption were recorded. Drug consumption other than

present treatment was not considered, except for past use of antacids and H₂ blockers.

The questionnaire for an individual patient could usually be completed within 30 minutes, the total consultation time being longer. As an internal validation on a subsample of about 300 patients, the physician was required to state whether or not the final questionnaire had proved a satisfactory instrument for interviewing the patient.

PATIENT SELECTION

The study is concerned almost exclusively with outpatient consultations seen on primary referrals from general practitioners (n=1433); 107 inpatients (7% of total) were recruited to enrich the proportion of 'organic' disease. Patients were seen at designated clinics staffed exclusively by consultant gastroenterologists, four of whom were not formally attached to the base hospital. Recruitment of outpatients was determined by clerical staff attached to the clinic from information in the referral letters and according to the broad outlines of our definition of dyspepsia. Patients were allocated to the study clinic when the physicians concerned were available as shown on a regularly updated rota. In practice therefore, the series is not consecutive, but representative of the outpatients seen in the general gastroenterology clinic of our hospital over 14 years (1974-87). The average accretion rate was 110/year.

FINAL DIAGNOSIS

Final diagnosis was established after appropriate investigation and follow up. To accommodate the possibility of coexisting alimentary disorders, up to three gastrointestinal diagnoses were permitted/patient, ranked by the physician responsible in the order he considered relevant, and qualified as certain, probable or possible as appropriate. When more than one condition was present the major clinical problem was recorded as the first diagnosis and is regarded as the principal diagnosis for each patient. All gastrointestinal diagnoses were subject to peer review.

TABLE II Principal (number, % certain, mean age, and % male) and additional diagnoses

	Principal (first) diagnosis				Additional diagnoses Total		
	n	% Certain	Mean age	% Male	n Second	n Third	n
Oesophageal disease (OES)	138	78	52.5	44	58	13	209
Simple	60				46		
Severe	78				12		
Gastric ulcer disease (GUD)	105	83	54.3	47	20	4	129
Duodenal ulcer disease (DUD)	399	70	40.8	68	129	14	542
Gastric carcinoma (GCA)	50	98	64.0	72	1	1	52
Symptomatic gall stones (CHOL)	58	93	50.2	22	2	-	60
Other organic disease (ORG)	123	87	48.3	40	17	5	145
Irritable bowel syndrome (IBS)	226	61	35.6	38	81	19	326
Functional dyspepsia (FD)	337	48	39.3	42	129	24	490
Alcohol related dyspepsia (ARD)	68	66	40.5	85	31	1	100
Other (OTH)	36	78	41.0	50	16	6	58
Total (%) of all diagnoses	1540	69	43.4	51	484	87	2111

Diagnoses considered as the principal (first) diagnosis for each patient (n=1540) as well as the second (n=484) and third diagnosis (n=87) by disease class. The final column gives the overall prevalence. Most patients with GUD, DUD, and FD, and all but one of those with GCA had an endoscopy. The class 'other organic disease' includes diverticular disease of colon (42), Crohn's disease (25), carcinoma of colon (17), pancreatic disease (10), ulcerative colitis in remission (9), and miscellaneous conditions (42). The 107 inpatients recruited comprise GCA (30), ORG (24), CHOL (16), DUD (11), GUD (8), OES (6), FD (5), ARD (4), IBS (2), and undiagnosable (1).

STATISTICAL ANALYSES

The data are presented principally for descriptive purposes, and statistical methods are applied to draw attention to outstanding differences rather than for hypothesis testing. χ^2 Tests were used to detect group differences; Student's *t* test or analysis of variance was used for continuous variables, unless they clearly came from non-normal distributions when Kruskal-Wallis was used as an overall test across diseases. The Scheffé procedure was used to detect differences between pairs of disease for continuous variables, if necessary done after logarithmic transformation. SPSS was used for data coding and analysis. When differences in incidence of symptoms between diseases were found, the contribution of each disease to a significant overall χ^2 was examined to identify the disease(s) responsible.

Results

DIAGNOSTIC CONDITIONS

The principal diagnosis (n=1540) (Table II)

All patients were given a principal or first diagnosis (23 undiagnosable cases being included as other diagnoses), the commonest being duodenal ulcer disease 399 (26%), functional dyspepsia 337 (22%), irritable bowel syndrome 226 (15%), and oesophageal disease 138 (9%). Alcohol related dyspepsia 68 (4%) was as common as symptomatic gall stones 58 (4%) or gastric carcinoma 50 (3%); the functional disorders, IBS and functional dyspepsia considered together, accounted for 563 or 37% of the principal diagnoses made.

Additional diagnoses (n=571) (Table II)

A single diagnosis was given to 1056 patients (69%), 484 (31%) were given two diagnoses, and 87 (6%) were given three, so that in all 571 diagnoses were given in addition to the principal disorder. The commonest of the additional diagnoses (considering second and third diagnoses together) were functional dyspepsia 27%, duodenal ulcer disease 25%, IBS 17%, and oesophageal disorders 12%. Other organic disorders, gastric ulcer disease, gall stones, and gastric cancer were rarely given as a second or third diagnosis. The functional disorders considered together accounted for 44% (253/571) of the additional diagnoses made.

Overall prevalence of disease

Table II (final column) gives the overall prevalence of the different conditions encountered. In all 2111 diagnoses were given to the 1540 patients seen, an average of 1.4 each. Thus, while duodenal ulcer disease was given as the principal diagnosis in 399 cases the total number considered to have duodenal ulcer disease was 542, representing 26% (542/2111) of all the diagnoses made, while oesophageal disorders accounted for 10%, functional dyspepsia for 23%, and IBS for 15%; the functional disorders considered together accounted for 816/2111 (39%) of all diagnoses made.

Diagnostic combinations

Additional diagnoses were given most often in patients with a principal diagnosis of oesophageal disease (51% with additional diagnoses), alcohol related dyspepsia (47%), IBS (44%), and gastric ulcer disease (23%). The commonest additional diagnosis was duodenal ulcer disease, which occurred in 19% of patients with a principal diagnosis of alcohol related dyspepsia, 18% of patients with gastric ulcer disease and 16% of patients with oesophageal disorders. The functional disorders commonly occurred together; of 563 patients with IBS (226) or functional dyspepsia (337), 94 (17%) had both, 51 (23%) of IBS patients having functional dyspepsia as an additional diagnosis, and 43 (13%) of functional dyspepsia patients having IBS.

Confidence in diagnosis

Although it was considered that investigation and follow up had been adequate, the principal diagnosis (Table II) was considered to be 'certain' in only 1058 of the 1540 patients (69%), 'probable' in 429 (28%), and 'possible' in 53 (3%). Of the 482 uncertain principal diagnoses, 355 (74%) were given a single diagnosis, the commonest being functional dyspepsia, duodenal ulcer disease, and IBS.

Diagnostic confidence varied considerably according to the conditions under consideration. Gastric cancer was considered certain in (98%), the single 'probable' case lacking histological proof. Symptomatic gall stones were considered 'certain' in 93%, 'severe' oesophageal disease in 90%, and 'other organic' disease in 87%. Gastric ulcer was considered certain in 83%, compared with duodenal ulcer of which only 70% were considered certain. By contrast, functional dyspepsia was considered certain in only 48% of cases, and IBS in 61%; the functional disorders taken together were considered 'certain' in 58%.

Diagnostic confidence varied also with the priority given to diagnosis, the proportion of 'certain' diagnoses falling from 69% of first (or principal) diagnoses, to 40% of second diagnoses, and 27% of third diagnoses. When all diagnoses ($n=2111$) are considered irrespective of rank, the functional disorders were again diagnosed with less confidence (IBS 51% certain, functional dyspepsia 41% certain) than any of the organic conditions (range 63–98%).

Doctors' confidence in diagnosis

There were considerable differences between individual physicians with respect to the confidence they were prepared to attach to their final diagnostic statements. One physician was more certain in his diagnosis both for organic (85%) and functional (84%) conditions than any of his colleagues whose use of 'certain' ranged from 35% to 57% for functional disease and 58–80% for organic disease. On average the diagnosis of organic disease was more confident (75% 'certain') than functional disease (51% 'certain'). It should be emphasised that diagnostic confidence is not the same as 'precision' in this context; all diagnoses were subject to peer

review, so that the precision of diagnosis is that of the group as a whole, rather than that of an individual observer.

SUITABILITY OF PROFORMA

In the subsample of 310 patients tested, the physicians considered that the proforma had been a suitable instrument for interviewing 266 (86%); the range of satisfied opinions between physicians was 72–96% with no significant differences between physicians or between disease classes.

DEMOGRAPHIC CHARACTERISTICS

Sex – although almost equal numbers of men ($n=780$) and women ($n=760$) were seen overall, there were considerable sex differences within disease classes, men predominating in alcohol related dyspepsia (5.8:1), gastric cancer (2.6:1), and duodenal ulcer disease (2:1), while women predominated in IBS (1.6:1), cholelithiasis (1.5:1), other organic disease (1.5:1), and functional dyspepsia (1.3:1). There was a slight excess of unmarried men to unmarried women (1.3:1) and more widows than widowers (2.3:1).

Age – overall, the mean (SD) age of women (45.0 (0.6)) was significantly greater than that of men (41.8 (0.6)); $p<0.0005$; however, while this differential obtained for all disease classes except gall stones, the effect was significant only in oesophageal disease ($p<0.005$). There were highly significant differences in age between disease classes ($p<0.001$), patients with gastric carcinoma being significantly older than any other disease class except gastric ulcer disease on group pair comparison. Analysis of the data emphasised the differences in age between functional and organic disorders, the comparative proportion of organic to functional disease being 0.6:1 in those under 25 years, 0.8:1 in those 26–40 years, and 2:1 in those older than 40 years.

Alcohol – alcohol consumption was calculated as units of alcohol consumed/week, one unit being calculated as the equivalent of half a pint of beer, one glass of wine or a measure of spirits, and weekly intake assessed as 'light' (<10 units), 'moderate' (10–25 units), or 'heavy' (>25 units). Information was available from 1535 patients of whom 382 (25%) said they did not drink at all; 901 (59%) were light drinkers, 173 (11%) moderate, and 79 (5%) heavy drinkers. Moderate/heavy drinking was 10 times more common in men (30%) than women (3%); 35% of women claimed total abstinence compared with only 16% of men. Alcohol consumption was highest in alcohol related dyspepsia (84% heavy or moderate drinkers, although 16% denied significant drinking) and was lowest in gastric cancer (6%) and cholelithiasis (3%); 21% of duodenal ulcer disease patients admitted heavy or moderate drinking. Of those admitting alcohol consumption at any level, 50% had been drinking at the same level for 10 years or longer while 23% had taken greater quantities in the past; 23% considered that alcohol made their symptoms worse.

Smoking – more than half the patients, 896 (59%), smoked to some degree, 214 (14%) habitually smoking more than 25 cigarettes per day ('heavy' smoking); 3% smoked pipes or cigars. Cigarette smoking was particularly common in duodenal ulcer disease 73%, gastric ulcer disease 74%, gastric carcinoma 69%, and in alcohol related dyspepsia 68%; the lowest proportion of smokers (41%) occurred in patients with oesophageal disease. Smoking at any level was commoner in men than women (1·2:1) and heavy smoking especially so (2·8:1).

Alcohol, smoking, and principal diagnosis – detailed analysis showed a striking overall association between smoking and alcohol with a significant positive association maintained within disease groups except for gastric carcinoma, alcohol related dyspepsia, and other/miscellaneous.

Duration of symptoms (Table III) – duration of symptoms varied considerably between disease classes ($p<0\cdot0001$), and ranged from a median 48 months in duodenal ulcer disease to seven months in gastric carcinoma. The mean duration was always much longer than the median, a few patients with a very long history of dyspepsia distorting the mean; for example four patients with gastric carcinoma complained of abdominal pain for over 10 years. Group comparisons (after logarithmic transformation) show that the history was longer in duodenal ulcer disease than in organic disease, gastric carcinoma, gall stones, IBS, and functional dyspepsia, and longer in gastric ulcer disease than in gall stones, gastric carcinoma, and organic disease.

Employment and work lost (Table III) – some 946 (61%) patients were in employment at the time of their first consultation and information was available from 809. Four hundred and forty five (55%) had lost some time from work because of their symptoms in the previous 12 months, 194 (24%) losing up to two weeks, and 153 (19%) losing more than four weeks. Patients with alcohol related dyspepsia were most likely to lose time from work, 70% losing some time, and 28% losing more than four weeks, while patients with oesophageal disease were least likely to take time off, 40% losing some time and only 4% losing more than four weeks. Mean time lost from work is given to point to the burden of disease on the working population and ranged from 31·2 (8·0) (weeks (SEM)) in organic disease to 11·1 (3·8) in oesophageal disease. Work loss was substantial in the functional disorders, amounting to 18·3

(2·5) weeks in functional dyspepsia and 12·8 (3·0) in IBS. Analysis of the data (after logarithmic transformation) by the Scheffé test (0·01 level) showed that no two groups were significantly different from each other even though the *F* test overall gave $p<0\cdot005$. In all, 16 011 weeks were lost from work in the previous 12 months by 809 patients. Of these the 5% (44 patients) with organic disease accounted for almost 9% (1373 weeks) of the weeks lost, and the 5% with alcohol related dyspepsia (40 patients) accounted for 7% (1192 weeks); by contrast the 5% with oesophageal disorders accounted for only 3% (488 weeks) of the total time lost.

SYMPTOMS/INDICANTS

Presenting symptoms

The principal symptoms presented at first consultation were abdominal pain/discomfort (63%), diarrhoea (8%), vomiting (7%), and heartburn (4%); dysphagia, 'wind', loss of appetite, recent gastrointestinal bleed, constipation, weight loss or poor general health were presented by 1–3% each, and 5% presented with miscellaneous symptoms. Men were more likely than women to present with upper gastrointestinal bleeding, nausea, anorexia and vomiting and less likely to present with constipation or dysphagia.

Abdominal pain/discomfort (n=1326) (Figure)

Abdominal pain or discomfort was the commonest symptom recorded, occurring in 1326 patients overall (86%). Pain occurred episodically in 897 (68%), daily in 365 (27%), and as attacks in 196 (15%); 39 patients confirmed that pain formerly episodic now occurred daily; in 138, pain occurred in more than one of these patterns. There were significant differences between disease classes ($p<0\cdot001$) for all three patterns (Figure).

Episodic pain occurred in duodenal ulcer disease (88%), gastric ulcer disease (81%), alcohol related dyspepsia (82%), functional dyspepsia (66%), and IBS (64%); the statistical differences seen are largely attributable to the comparative frequency of episodic pain in duodenal ulcer disease ($p<0\cdot001$) and its infrequency in gall stone disease ($p<0\cdot001$). The frequency of episodes (recorded as the number from one to eight, or nine or more in the previous year) differed significantly between disease

TABLE III Duration of symptoms, work lost, and first diagnosis

	OES	GUD	DUD	GCA	CHOL	ORG	IBS	FD	ARD	Other	Total
<i>Duration of symptoms (mth)*</i>											
No	136	103	393	50	57	112	226	333	65	35	1 510
Mean	60·6	78·5	77·2	39·7	23·4	44·1	39·1	44·8	43·1	32·7	54·7
Median	24	36	48	7	8	12	18	24	24	12	24
<i>Work lost (wk)</i>											
No in employment**	44	52	264	12	18	44	133	181	40	21	809
% Losing time from work	40	46	59	33	60	59	52	53	70	71	55
Total no weeks lost	488	889	6230	221	203	1373	1702	3312	1192	401	16 011
Mean time lost (wk) (excluding no time lost)	27	37	40	55	18	53	25	35	43	27	36
% Losing >4 wk	4	14	27	8	10	22	12	18	28	24	19

*Kruskal-Wallis one way analysis of variance corrected for ties ($\chi^2=134\cdot5$; $p<0\cdot0001$).
*Scheffé test at 0·01 level for differences between pairs – DUD significantly greater than CHOL, GCA, organic disease, IBS, and FD; GUD significantly greater than CHOL, GCA, and organic disease; OES significantly greater than CHOL and GCA.
**Excludes patients <16 and >65 years, unemployed, retired or students, and those for whom information was not available.
Abbreviations as in Table II.

Episodic pain was defined as pain that occurred for days or weeks at a time and then disappeared to recur later. Attacks of pain were defined as pain that occurred in isolated attacks, lasting at least 15 minutes at a time, and daily pain was considered present when a patient described pain that was continuous or occurred daily or 'never leaves'. Pain patterns – episodic, daily, attacks – are shown according to disease class; OES = oesophageal disease; GUD = gastric ulcer disease; DUD = duodenal ulcer disease; GCA = gastric carcinoma; CHOL = symptomatic gall stones; ORG = other organic disease; IBS = irritable bowel syndrome; FD = functional dyspepsia; ARD = alcohol related dyspepsia; OTH = miscellaneous (see text).

classes ($p < 0.0001$), mean/median values ranging from 7.1/8 per year in IBS to 4.9/4 per year in duodenal ulcer disease. On group pair comparisons mean frequency in IBS was significantly greater than in duodenal ulcer disease, with no significant differences detected between any other pairs. The method of recording, however, may have underestimated the proportion of patients with very frequent episodes. Nine or more episodes were recorded in over 25% of IBS, organic disease, alcohol related dyspepsia, gastric ulcer disease, and functional dyspepsia.

Daily pain/discomfort occurred most commonly in gastric carcinoma (80%) and organic disease (50%) and least commonly in duodenal ulcer disease (17%) and gall stone disease (11%), the effects reaching statistical significance for gastric carcinoma ($p < 0.001$), and organic disease ($p < 0.01$).

Attacks of pain were characteristic of gall stone disease (91%), this high proportion accounting

almost entirely for the overall statistical differences seen.

A subsample of patients (430) were asked if they had experienced any pain(s) in addition to, or occurring at different times to their main pain(s) during the current illness. More than one pain was complained of by 169 patients, the effect being recorded in 17–20% of patients with functional dyspepsia, IBS, and organic disease who were asked:

Emergency treatment from a general practitioner or hospital casualty service had been requested on one or more occasion by 269 patients (17% of total), the commonest causes being duodenal ulcer disease (63), functional dyspepsia (58), gall stone disease (41), IBS (36), and organic disease (34). There were significant differences between disease classes ($p < 0.001$), the proportion with a history of emergency treatment being most frequent in gall stone disease (71%), organic disease (28%), functional dyspepsia, duodenal ulcer disease, and IBS (17%) each and alcohol related dyspepsia (9%).

Attributes of pain in patients with episodic or daily pain ($n = 1179$) (Table IV) – Patients whose pain was episodic or occurred daily were asked further questions about the nature of their pain and its relief. The indicants – food makes pain better, food sometimes relieves pain, pain still relieved by antacids, frequent night pain waking patient from sleep, and frequent night pain relieved by antacids, food or milk – all occurred more commonly in peptic ulcer disease than in any other disease class. The statistical differences seen in the incidence of these five indicants can be attributed to the 'positive' (higher incidence) effects in duodenal ulcer disease ($p < 0.001$) and the 'negative' effects in organic disease ($p < 0.001$) and IBS ($p < 0.01$). There were some 'positive' contributions from gastric ulcer disease (food makes pain better $p < 0.01$ and food sometimes relieves $p < 0.01$) and a 'negative' contribution from IBS and functional dyspepsia (night pain and relief $p < 0.001$).

Unrelieved pain that was not relieved by treatment, food or bowel motion, occurred most commonly in organic disease (49%, $p < 0.001$) and IBS (47% $p < 0.001$), and least commonly in duodenal ulcer disease (16%, $p < 0.01$) and gastric ulcer disease (13%, $p < 0.01$).

TABLE IV Attributes of pain in patients with episodic or daily pain as % ($n = 1179$)

Symptom No	OES 69	GUD 93	DUD 373	GCA 37	ORG 93	IBS 182	FD 263	ARD 49	Other 20	p	Overall %
Effect of food*											
Better	16	44	46	24	8	13	24	19	35	<0.001	29
Worse	33	27	17	43	28	30	28	35	9	<0.001	26
No effect	51	29	37	32	64	58	47	46	56	<0.001	46
Food relief sometime†	47	69	73	57	18	24	44	49	45	<0.001	50
Antacid relief still	62	60	65	43	19	16	42	43	48	<0.001	46
Never	19	18	16	24	27	37	32	26	22	<0.001	25
Night pain often	29	32	44	27	28	16	20	21	32	<0.001	28
Night pain often and relief	29	22	39	17	8	3	9	10	20	<0.001	19
Unrelieved pain	30	13	16	30	49	47	32	41	26	<0.001	29
Stress pain	42	45	46	31	30	36	44	43	32	0.4831	41

Questions concerning the effects of food/milk on pain were put twice at different times. The first question * asked whether pain had a definite relation to eating food; the second question † asked more generally if pain had been relieved by food or milk at some time in the past. Four questions concerning antacid relief asked if antacids still relieve pain, have relieved at some time in the past but do so no longer, have never relieved, or have never been tried: responses to two questions are given, the other responses providing no useful information. Questions concerning night pain asked if this occurred often, rarely or never; and if it did occur whether it was then often, rarely or never relieved by a snack, antacids, milk or a little warm water. 'Stress pain' was defined as patients believing that there was some association of the abdominal pain with nervous tension or stress at home or work. Figures in bold type are significantly greater or lower than expected. Abbreviations as in Table II.

Stress pain attributed by the patient to stress occurred commonly but the incidence did not differ between disease classes.

Seasonal variation in pain occurred in 116/692 (17%) of patients with a history longer than two years. The effect was commonest in peptic ulcer disease, occurring in 75/321 (23%) and with almost equal frequency in gastric ulcer disease and in duodenal ulcer disease, 75% of whom considered winter as the worst season. Seasonal variation was negligible in all other disease classes excepting functional dyspepsia in which it occurred in 13%.

Additional attributes of pain were elicited from a subsample of about a third of patients (532) interviewed using the mark II form in the later years of the project, comprising duodenal ulcer disease (104), gastric ulcer disease (43), functional dyspepsia (102), IBS (92), organic disease (65), oesophageal disease (39), gastric carcinoma (26), alcohol related dyspepsia (27), gall stones (23), and 'other' (11).

Relief of symptoms by cimetidine had been obtained in peptic ulcer disease (58%), oesophageal disease (29%), and functional dyspepsia (15%), the effect in peptic ulcer disease being significantly greater than other disease groups ($p < 0.0001$).

'Hunger pain' was described by 36% of patients with duodenal ulcer disease, 29% gastric ulcer disease, 30% gastric carcinoma, but by no more than 12% of any other disease class, the effects in duodenal ulcer disease and gastric ulcer disease reaching significance ($p < 0.01$).

Colicky pain was virtually confined to IBS (49%) and organic disease (46%), occurring significantly more often in these two conditions than in any other ($p < 0.0001$).

Relief of pain by belching was obtained in oesophageal disease (56%), duodenal ulcer disease (55%), gastric ulcer disease (64%), gastric carcinoma (81%), functional dyspepsia (36%), and organic disease (36%), with no significant differences between disease classes.

Localisation of pain – usable information was recorded for 1326 patients. Precise localisation with the 'pointing sign' (pain site located with the use of one finger) was obtained in 92 patients (7%) and given by about 10% of patients with oesophageal disease, gastric ulcer disease, duodenal ulcer disease, alcohol related dyspepsia, and gastric carcinoma, 5% of patients with functional dyspepsia and by less than 5% in all other disease classes. More diffuse localisation using several fingers was given by 374 patients and recorded for about one third of patients with gastric ulcer disease, duodenal ulcer disease, gastric carcinoma, and functional dyspepsia (range 28–35%). Poor localisation using the whole hand or both hands with or without movement over an area was given by 890 patients, most commonly in IBS and organic disease (85% each) but by more than 50% of duodenal ulcer disease, gastric ulcer disease, and gastric carcinoma. Although there was great variation overall ($p < 0.0001$) it was not possible to attribute this to specific disease classes.

Sites of pain/tenderness – a striking feature was the multiplicity of sites recorded for pain. In all 2413 sites were recorded for the 1326 patients

who complained of pain, an average of 1.8 each, ranging from 1.9 sites/patient in organic disease and IBS, to 1.1 in alcohol related dyspepsia. The effect is largely accounted for by the wide localisation of pain given by most patients; for example in gall stone disease pain reference included both the right hypochondrium (65%) and the epigastrium (62%). Epigastric pain was recorded by more than half the patients (755), and reported by 60–70% of all patients with gastric ulcer disease, duodenal ulcer disease, gastric carcinoma, and gall stone disease, 40–50% of those with functional dyspepsia, alcohol related dyspepsia or oesophageal disease and by about 20% of patients with IBS or organic disease. Pain was referred to the right hypochondrium by 287 patients (gall stone disease 65%, and by about 20% of patients with gastric ulcer disease, duodenal ulcer disease, functional dyspepsia, and organic disease) and to the left hypochondrium by 196 (about 15% of gastric ulcer disease, duodenal ulcer disease, functional dyspepsia, and gall stone disease). Lower abdominal pain occurred in 838 patients with almost equal incidence in the right and left iliac fossa and hypogastrium, principally in IBS (35%), organic disease (28%) and functional dyspepsia (12%). Mid abdominal pain including right and left lumbar and periumbilical areas occurred in 409 patients and was reported by 10–15% of patients with organic disease IBS or functional dyspepsia. There was poor agreement between sites of pain and tenderness and between both and disease class. Although epigastric pain was recorded for 755 patients, epigastric tenderness was elicited in only 208, most often in gastric carcinoma (20%), duodenal ulcer disease (18%), and gastric ulcer disease (17%). Tenderness at any site was elicited in only 759 patients.

Radiation of pain – usable information was recorded for 1182 patients, and radiation of pain was recorded in 370 (31%). Radiation to the back had been experienced by 262, occurring in 33% of patients with gall stone disease and by 20–25% of patients with oesophageal disease, gastric ulcer disease, duodenal ulcer disease, gastric carcinoma, functional dyspepsia, and organic disease. Radiation to the right shoulder was experienced by 50 patients, occurring significantly more often (33%) in gall stone disease than in any other disease class ($p < 0.0001$). Radiation to other sites occurred in 50 patients.

Other symptoms

Table V gives some of the 78 general indicants sought for in all 1540 patients.

Gastrointestinal bleeding – a previous history of haematemesis or melaena was elicited in about 17% of all patients, most often in gastric carcinoma (34% $p < 0.01$), alcohol related dyspepsia (32%, $p < 0.01$), and duodenal ulcer disease (26%, $p < 0.001$) and least often in IBS (5%, $p < 0.001$).

Heartburn occurred in 26% overall, being commonest in oesophageal disease (64%, $p < 0.001$) and least common in IBS (12%, $p < 0.01$).

Waterbrash (by which is meant excessive

TABLE V Incidence (%) of some indicants in entire study group (n=1540)

Indicant No of patients	OES 138	GUD 105	DUD 399	GCA 50	CHOL 58	ORG 123	IBS 226	FD 337	ARD 68	Other 36	p	Overall %
Previous GI bleed	14	23	26	34	7	10	5	12	32	14	*	17
Heartburn	64	23	32	22	19	21	12	20	25	23	*	26
Waterbrash	37	42	38	52	26	27	14	22	34	20	*	30
Lost appetite	35	56	47	64	29	48	35	40	55	39	*	43
Vomiting	22	34	34	49	23	21	11	24	59	33	*	27
Retching	34	41	45	48	40	31	33	39	70	36	*	40
Nausea	17	39	34	48	28	43	32	39	37	33	*	35
Flatulence	52	52	53	54	52	40	45	51	40	49		50
Early repletion	36	56	46	74	34	35	48	45	54	40	*	45
Bloating	16	20	20	29	12	22	26	21	18	19		21
‘Wind’	29	25	27	26	32	22	34	30	29	24		28
Bowel action-pain relief	20	15	22	27	19	56	57	22	27	25	*	30
Bowel action-pain worse	2	2	2	7	4	11	17	7	4	14	*	7
Acid regurgitation	31	20	28	14	12	17	9	17	13	22	*	20
Weight loss	20	34	26	72	32	50	16	23	33	25	*	28
Family history ulcer	28	38	50	14	26	26	29	38	38	40	*	37
Previous psychotropic treatment	35	20	26	9	31	28	38	46	18	26	*	32

*Shows significant differences between disease classes (χ^2 test). Figures in bold type show a symptom incidence in a disease significantly higher or lower than the average. It is these incidence rates that largely account for the overall statistical significance. GI=gastrointestinal. Other abbreviations as in Table II.

salivation) occurred in about 30% overall, being most common in gastric carcinoma (52%, $p<0.01$) and least common in IBS (14%, $p<0.001$).

Loss of appetite during the current illness occurred in 43% of patients overall, being significantly more common in gastric carcinoma (64%), and least common in gall stone disease (29%).

Vomiting during the current illness occurred in 27% overall, being most common in alcohol related dyspepsia (59%, $p<0.001$), gastric carcinoma (49%, $p<0.01$), and duodenal ulcer disease (34%, $p<0.01$), and least common in IBS (11%, $p<0.001$).

Retching occurred in 40% overall, occurring much more frequently in alcohol related dyspepsia (70%) than in any other disease class; alcohol related dyspepsia accounts almost entirely ($p<0.001$) for the statistical differences seen.

Nausea occurred in 35% overall, the statistical differences between disease classes being largely attributable to the comparative infrequency of nausea in oesophageal disease ($p<0.001$).

Weight loss (>7 lb) occurred in 28% of all patients, most frequently in gastric carcinoma (72%, $p<0.001$) and organic disease (50%, $p<0.001$), and least often in IBS (16%, $p<0.01$).

A family history of ulcer was obtained in 37% overall, most often in duodenal ulcer disease (50%, $p<0.001$), and least often in gastric carcinoma (14%, $p<0.01$).

Psychotropic treatment had been required in the past by 32% of all patients, most often in functional dyspepsia (46%, $p<0.001$) and least often in gastric carcinoma (9%, $p<0.01$).

Signs were few. Hepatomegaly was recorded in 52 patients (4%) overall, significantly more often in alcohol related dyspepsia (24%) and gastric carcinoma (23%) ($p<0.001$) and in less than 10% of any other disease class. An abdominal mass was found in 61 cases, most often in the epigastrium (24), right iliac fossa (14), and right hypochondrium (9). The sigmoid colon was palpable in 237 patients and considered palpable and hard in 66; both signs occurred in about 15% and 4% respectively of all patients with little variation between disease classes. The

indicant palpable and tender sigmoid, however, was found significantly more often in IBS (27%) ($p<0.001$) than in any other conditions (organic disease 12%, functional dyspepsia 10%, and in less than 5% in all other classes). A succussion splash was elicited in 51 patients, significantly more often in gastric carcinoma (27%, $p<0.001$) and duodenal ulcer disease (7%, $p<0.01$), than in any other class (gastric ulcer disease 5%, oesophageal disease and functional dyspepsia 2% each). An appendectomy scar, noted in 62 patients, was present in about 4.5% of all patients with little variation between disease classes.

Discussion

We think of dyspepsia as a disease space of undetermined dimensions occupied by many conditions that share a more or less common core of symptoms, some of which may coexist, and like others¹¹ we find it difficult to define. Our version ('any form of episodic, recurrent or persisting abdominal pain or discomfort or any other symptom referable to the upper alimentary tract excepting bleeding or jaundice, of at least four weeks duration'), however, is broadly similar, although less restrictive than several other more recent definitions given in published works.¹²⁻¹⁸ In any case, the definition served well as an operational framework for our study and we believe it captures the conditions generally included in the generic term dyspepsia.

Up to three gastrointestinal diagnoses were permitted/patient and multiple diagnoses were common; almost one third of patients (31%) were given two diagnoses and 6% given three, so that the study group of 1540 patients shared 2111 diagnoses between them, an average of 1.4 each. Duodenal ulcer disease and functional dyspepsia were the commonest conditions encountered each accounting for about a quarter of principal diagnoses and for similar proportions of the total diagnoses that were made.

The importance of the functional disorders in generating dyspeptic symptoms is emphasised. Functional dyspepsia and IBS considered together accounted for 37% of the principal diagnoses, and for 39% of the total number of

2111 diagnoses made, functional dyspepsia accounting for 23% (490), and IBS for 15% (326).

Alcohol abuse was given as the main cause of dyspepsia in 68 patients (4%), and considered 'certain' in 66%. Twenty one were given an additional diagnosis (duodenal ulcer disease 12; functional dyspepsia 5; oesophageal disease 4). When the patients with an additional diagnosis are discounted, alcohol abuse as the sole discoverable cause of dyspepsia occurred as commonly in our series ($n=47$) as did gastric cancer. Although the effects of alcohol on the gastrointestinal tract are well known,¹⁹ alcohol as a cause of persisting dyspepsia seems to receive little attention in published works and may well be underestimated in practice. We have coined the term alcohol related dyspepsia to draw attention to this important cause of dyspepsia.

The requirement for clinicians to qualify diagnoses in terms of the confidence with which they were made has led to novel, and we think important findings. As might be expected, diagnostic confidence varied with the priority given to a diagnosis, the proportion of certain diagnoses falling from 69% of principal (or first) diagnosis to 40% of second and 27% of third diagnoses. As might be expected also, organic conditions that are capable of objective confirmation were diagnosed more confidently than the functional disorders that are not. Thus confident diagnosis of gastric carcinoma (98% certain) and severe oesophageal disease (90% certain) can be obtained at endoscopy, and it is generally possible to obtain objective confirmation of the organic disease (87% certain) included in our study. The difference in diagnostic confidence as between gastric ulcer disease (84% certain) and duodenal ulcer disease (70% certain) seems to be a real effect ($p<0.0001$) and may reflect the perceived cost of diagnostic error rather than differences in diagnostic accuracy. Whereas a single less than confident examination might be considered sufficient for the management of duodenal ulcer disease, repeated examinations are required to confirm healing or exclude malignancy, or both in gastric ulcer disease and it might be supposed that repetitive examination would increase confidence in the diagnosis. Biliary colic is a special case. While gall stones can be confidently shown by conventional imaging, the decision symptomatic or not turns on clinical evidence. Biliary colic is one of the most readily recognised clinical entities; or, as Card has put it, carries high 'diagnosability' (unpublished data). The high diagnosability of biliary colic as a clinical phenomenon doubtless accounts for the confidence attached to the diagnosis of symptomatic gall stones (93% certain).

The functional disorders are incapable of objective confirmation and diagnosis rests on symptomatic evidence supported to a greater or lesser extent by exclusion of organic disease after investigation. Although operational guidelines have been proposed for the diagnosis both of IBS and functional dyspepsia,^{11 17 18 20-23} they fall short of explicit definition so that there are no critical rules or rigorous paradigms against which symptomatic diagnosis can be tested. Indeed a

previous study from this unit suggested that diagnosis of IBS was made not on explicit rules but on an implicit perception of the disorder, which was broadly agreed but not consistently applied by the members of our group either individually or collectively^{8 24}; although not formally tested, it seems probable that similar considerations apply in the case of functional dyspepsia.

This study suggests that diagnosis of the functional disorders is subject to considerable, perhaps inevitable uncertainty. Even when given as the principal or first diagnosis IBS was considered 'certain' (probability >0.9) in 61% of cases and functional dyspepsia in 48%; when the total of the two conditions is considered irrespective of diagnostic ranking, confidence was even less with only 51% of IBS cases and 41% of functional dyspepsia regarded as 'certain'. The fact that IBS was diagnosed with more confidence than functional dyspepsia suggests either that the members of our group are more comfortable with the diagnosis of IBS than they are with functional dyspepsia, or that IBS has higher diagnosability.

To our knowledge this is the first attempt to consider the issue of confidence in the diagnosis of dyspepsia, and by implication the reliability of diagnosis of the functional disorders. Taken together our findings suggest that diagnosis of the functional disorders is subject to uncertainty and to variation in perception of these disorders between different individuals, if not between different centres. While our results and tentative conclusions require validation, for the time being it seems to us that the convention of qualifying diagnosis of the functional disorders in terms of the confidence with which they are made – such as 'certain', 'probable', or 'possible' – would help to clarify clinical practice and improve the design of clinical trials in this important area.

The differences in the degree of confidence that physicians are prepared to attach to diagnosis is not readily explained, except by supposing that doctors differ in their readiness to be satisfied by clinical evidence or in the threshold levels they accept for positive decision making.²⁵

The demographic data specify the study group, and require little comment. The well recognised sex differences between disease classes and the comparative changes in the proportion of organic to functional conditions with age are confirmed. More than half (59%) of patients smoked and three quarters (75%) used alcohol, smoking being especially common in duodenal ulcer disease (73%), gastric ulcer disease (74%), gastric carcinoma (69%), and alcohol related dyspepsia (68%). Alcohol use was greatest in patients with alcohol related dyspepsia although 16% of patients (mainly female) with undoubted abuse only admitted drinking lightly. Moderate or heavy alcohol use was admitted by almost 25% of male patients with duodenal ulcer disease, gastric ulcer disease, functional dyspepsia, or IBS, but by less than 10% of patients with gastric carcinoma; alcohol was considered to exacerbate symptoms by 23% of patients who used it. There was a strong positive association between tobacco and alcohol

use overall, with women using less of either than men.

More than half of our patients in employment (54%) had lost time from work in the previous 12 months because of their symptoms, mean time lost being greatest in those with organic disease and least in those with oesophageal disorders. Substantial work loss was seen in patients with functional disorders and in alcohol related dyspepsia. There was a significant decline in the proportion of patients with duodenal ulcer disease between the early and later years of the study (26 to 15% of principal diagnoses).

Pain/discomfort was much the commonest symptom encountered, occurring in 91% of patients overall, and given as the presenting symptom by 63%.

A notable finding was the multiplicity of pain sites recorded, the average being 1.8 sites/patient with a tendency to more sites being recorded for patients with organic disease and IBS. The effect seems largely attributable to the diffuse localisation of pain given by most of our patients (67%), and is consistent with the wide pain reference in common causes of dyspepsia given by others.^{26 27}

Other characteristics of pain provided more useful information. While episodic pain predominated in peptic ulcer disease, it also occurred in more than half of patients with alcohol related dyspepsia, functional dyspepsia, and IBS. While the data do not reach statistical significance, our data suggest that episodes of pain occur more frequently and are of shorter duration in the functional disorders than in peptic ulcer disease, as seen previously by Edwards and Coghill.²⁶ The unremitting nature of pain in gastric cancer (which we prefer to designate 'daily pain') was confirmed, but we found that daily pain occurs also in a considerable proportion of patients with gastric ulcer disease and organic disease. The relevance of a short history of dyspepsia occurring for the first time in patients over the age of 45 in the diagnosis of gastric carcinoma is again emphasised.

A history of emergency treatment for pain was given by 269 patients (17%), proportionately greater for patients with gall stone disease (65%) and organic disease (26%). There was a high demand for emergency relief by patients with functional disorders, which accounted for no

fewer than 94 or one third of all the demands for 'emergency' treatment made (functional dyspepsia 58, IBS 36). This finding emphasises the importance of these two diagnoses in the differential diagnosis of the acute abdomen, particularly patients labelled as having 'non-specific abdominal pain', which accounted for 70% of diagnoses in a recent study.²⁸

The data confirm that relief of pain by food, antacids or cimetidine, frequent night pain, especially when it is relieved by antacids or food, the perception of pain as hunger pain, and seasonal variation in pain are all suggestive for peptic ulcer disease.

Where comparisons were possible, our results agree broadly with the results obtained in some previous studies of dyspepsia^{26 27 29} but not all,³⁰ perhaps because the latter describes patients in surgical wards only (Table VI).

Among symptoms that were sought for in all patients, vomiting and retching both occurred much more frequently in alcohol related dyspepsia than in other diseases. The indicants flatulence, early repletion, wind, and bloating often attributed to dysmotility like dyspepsia were common in all disease classes and against this general background did not occur more often in functional dyspepsia or IBS than in other diseases. Weight loss was predictive of organic disease and occurred most commonly in patients with gastric carcinoma or organic bowel disease. Indicants generally suggestive of functional disorder were age under 40, a short history, several pains, and no pain relief from food or antacids.

This paper describes the conduct and overall results of our prospective study. These data have been used to make a preliminary examination of the power of symptom evidence in discriminating between different causes of dyspepsia.^{3 5-7 31 32} We hope soon to publish the definitive analyses.

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TABLE VI Comparison of symptom prevalence in four principal diseases from different studies

	% GUD						% DUD						% FD						% GCA*					
	A	B	C	D	E	M	A	B	C	D	E	M	A	B	C	D	E	M	A	D	E	M		
Epigastric pain	62	46	—	54	66	57	74	55	—	75	86	72	49	59	—	71	52	57	56	57	54	55		
RH pain	17	6	32	8	6	13	21	7	42	6	9	17	21	4	23	7	12	17	22	9	1	11		
LH pain	17	6	—	17	6	12	14	5	—	4	3	9	15	5	—	8	4	10	16	14	5	10		
Radiation to back	24	20	—	29	34	25	26	24	—	31	26	27	19	15	—	20	28	19	20	30	10	15		
Night pain	32	43	—	—	32	36	44	50	—	—	70	49	20	25	—	—	32	23	27	—	16	20		
Food better	44	49	45	—	2	38	46	63	51	—	20	46	24	32	22	—	4	24	24	—	1	19		
Worse	27	24	32	—	20	25	17	10	33	—	0	16	28	45	36	—	15	35	43	—	15	26		
No effect	29	8	—	—	55	27	37	13	—	—	50	34	47	8	—	—	65	33	32	—	50	44		
Antacids better	60	87	61	—	36	64	65	81	57	—	39	63	42	75	31	—	26	41	43	—	9	21		
Family history of ulcer	38	15	52	—	—	33	50	26	35	—	63	45	38	18	28	—	42	29	14	—	—	12		
Heartburn	23	19	48	—	—	26	32	27	51	—	—	34	20	28	48	—	—	37	22	—	—	24		
Nausea	39	54	29	—	70	48	34	49	29	—	59	36	39	42	46	—	60	44	48	—	77	64		
Vomiting	34	38	—	—	73	43	34	25	—	—	57	35	24	26	—	—	34	25	49	—	66	60		

RH and LH indicate pain referred to the right and left hypochondrium respectively. The letters A-E below show the series included for comparison, with the numbers of patients in each given in brackets. A=present study (n=1540); B=Edwards and Coghill 1967 (n=424); C=Johannessen *et al* 1990 (n=930); D=Kang *et al* 1992 (n=632); E=Horrocks and de Dombal 1978 (n=360); M=Weighted average value.
*Gastric cancer - studies B and C are not considered; study B did not include GCA, and study C included only nine cases (study D included 21 cases and study E included 80 cases). Abbreviations as in Table II.

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