Bellyaching in These Pages: Upper Gastrointestinal Disorders in 
Psychosomatic Medicine

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Objective: The evolution of views regarding the impact of psychosocial factors on peptic ulcer was traced by examining all articles related to the upper gastrointestinal tract published in Psychosomatic Medicine since its inception. Methods: Titles were retrieved using MEDLINE and by manually searching tables of contents for the years 1939 through 2000. The articles were classified by type and reviewed for gastrointestinal topic, broad biopsychosocial themes, methodology, and hypotheses. Results: One hundred seven articles were found, peaking in the 1960s. Of these, 73.8% reported large-sample research, 10.3% were case reports or series (all before 1965), and 15.9% were review articles or commentaries (most frequent before 1950 and after 1990). The chief topic was peptic ulcer in 47.7%, ulcer related in 29.9%, nonulcer dyspepsia or motility in 15.0% (dominating research since 1990), and miscellaneous in 7.5%. Original investigations related to peptic ulcer dropped off steadily after 1970. Attention was consistently paid to interactions of psychological factors with gastric acid secretion but not with several other important ulcer risk factors: Helicobacter pylori, smoking, and nonsteroidal antiinflammatory drugs. Interest in personality, stress, and laboratory methodology remained steady over time, whereas psychoanalysis and the specificity hypothesis declined, and statistical comparisons and quantitative approaches to psychological assessment rose. Conclusions: Psychosomatic Medicine articles reflect the life history of the stress-acid theory of peptic ulcer: hypothesis generation through case studies; a boom of experimental research; and retrenchment into literature reviews with a falloff in original investigations when new views of etiology and effective medical therapies appeared. Key words: peptic ulcer, stress, stomach, duodenum, dyspepsia, history of medicine.

INTRODUCTION

Peptic ulcer was once considered a model psychosomatic disease. The connections among personality, life stress, an inherited predisposition, and elevated gastric acid secretion fit so neatly with what was known of ulcer pathophysiology that this condition became, for decades, synonymous with the very notion of mind-body interactions in the eye of both professionals and the lay public. In the past decade the theory that stress-related increases in gastric secretion are the most important factor in ulcer pathogenesis has given way to emphasis on the role of a bacterial agent, Helicobacter pylori (1). It is therefore of particular interest for those of us trying to tease out the role of psychosocial factors in human disease to trace the history of upper gastrointestinal pathology in the flagship journal of scientific psychosomatics, Psychosomatic Medicine (PM). This article is one of a series of historical reviews commissioned by PM.

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METHODS

Titles of possible PM articles involving the esophagus, stomach, and/or duodenum were retrieved using two methods. First, a search was performed in MEDLINE (1966–2000) and Old MEDLINE (1960–1965) (2) using the following key words: duodenal, duodenitis, duodenum, dyspepsia, gastric acid, gastric, gastritis, gastroduodenal, gastroduodenal, hydrochloric acid, pepsinogen, peptic ulcer, and stomach. Second, tables of contents for all issues of PM published between 1939 and 1967 and for the year 2000 were searched by hand.

The articles identified through these methods were then reviewed. Each was characterized as to the academic title of the first author, the type of article, the gastrointestinal subject (peptic ulcer, gastroesophageal reflux and other organic conditions other than ulcer, animal models of ulcer, motility or functional disorders such as nonulcer dyspepsia, and miscellaneous topics), and the species under consideration. The articles were categorized according to whether they showed interest in peptic ulcer, in the stress-acid-ulcer hypothesis, and in a series of general psychosomatic themes: interactions between psychosocial and nonpsychosocial factors, subjective experience as described in the subjects’ own words, psychologically oriented therapies, psychodynamics, the specificity hypothesis, personality, and stress. Among articles reporting original research, the use of specific methodologies was examined, including psychological interviews, projective techniques, quantitative psychological measures, laboratory methods, and statistical comparisons. An attempt was made to identify lines of thinking and recurrent theories and to trace them over time by identifying for each article the chief underlying hypothesis. These categories, and the classification of articles within them, were necessarily chosen and applied on the basis of criteria that were to a large extent personal and subjective.
Time trends were examined by dividing the 62-year period of study into seven roughly equal periods (9 years each except a final one of 8 years); time trends were also evaluated for evidence of the influence of specific PM editors. The impact of changes in journal size was evaluated by examining the number of PM articles listed in MEDLINE in each decade for which data were available. To put temporal trends into perspective, the number and distribution of MEDLINE articles with the key word peptic ulcer with and without the subhead psychology were examined in the medical literature as a whole for this same period.

RESULTS

One hundred ten articles were retrieved using the above methods. Three were excluded on review, one because data regarding patients with peptic ulcer were gathered but not reported or discussed, another because an inappropriate anatomical region was studied (gastrointestinal transit time), and a third because patients with upper gastrointestinal disorders were a small subject subset that was not analyzed separately. The final sample thus included 107 articles.

The distribution of articles varied strikingly over time: between 1950 and 1985 it rose and fell in a bell curve peaking in the 1960s, and there were smaller clusters of articles in the 1940s and after 1990 (Figure 1). The total number of PM articles listed in MEDLINE remained relatively constant until the past decade (269 in the 1960s, 281 in the 1970s, 285 in the 1980s, and 744 in the 1990s); with adjustment for the total number of articles, the trend of articles about upper gastrointestinal topics declined steadily and lacked a second peak (13.4% of PM articles were related to upper gastrointestinal topics in the 1960s, 5.7% in the 1970s, 2.1% in the 1980s, and 2.0% in the 1990s).

The number of articles related to peptic ulcer in the broader medical literature was 5649 in the 1960s (0.35% of all MEDLINE articles on all topics), 5514 (0.21%) in the 1970s, 5235 (0.16%) in the 1980s, and 4594 (0.11%) in the 1990s (3).

Ninety of the PM articles (84.1%) reported original investigations, including 11 case reports or case series (10.3%); the remaining 17 (15.9%) were think pieces (review articles, commentaries, or editorials), which were concentrated in the earliest and latest periods (Figure 2). In 72.0% of the articles, human beings were the only species considered. The 107 articles had a total of 77 different first authors, with 13 writers first-authoring 2 to 7 articles each. The proportion of first authors holding an MD degree, 60.7%, was stable over time except for a peak during the first 9 years of publication (93.3%) and a drop to 31.8% in 1966 to 74.

Nearly half the articles (47.7%) discussed human peptic ulcer; another 29.9% were indirectly related to ulcer (14.0% examined gastric acid secretion and 15.9% animal models of ulcer), whereas 15.0% focused on motility or functional disorders and 7.5% studied mixed upper gastrointestinal disorders or miscellaneous topics (obesity, gastric-related language in psychoanalytic sessions, etc.). No articles addressed esophageal pathology. Articles other than peptic ulcer-related research represented a higher percentage of the total in the earliest and latest periods (Figure 3); of 17

Fig. 1. All articles concerning the upper gastrointestinal tract published in Psychosomatic Medicine between 1939 and 2000.

Fig. 2. Number of upper gastrointestinal articles in Psychosomatic Medicine according to article type: trends over time.

Fig. 3. Number of upper gastrointestinal articles in Psychosomatic Medicine related to each upper gastrointestinal topic: trends over time.
articles on upper gastrointestinal topics since 1990, 8 were reviews or commentary and 7 examined nonulcer dyspepsia or motility.

The 12 underlying hypotheses that were common to three articles each (Table 1) could be clustered under five broader theses: gastric acid secretion interacts with psychological determinants to influence ulcer; psychologically oriented therapy aids upper gastrointestinal pathology; personality structure affects the development or course of peptic ulcer; explanations of ulcer etiology require sophisticated multifactorial models; and stress induction of ulcers in animals varies with psychological or endocrine manipulations. As can be seen in Figure 4, the centrality of acid and the complexity of animal models had slightly staggered, time-limited trajectories, the first running from the late 1940s to the early 1970s, the second a few years later. The only one of these broad theses still receiving at-

**TABLE 1. Principal Hypotheses Examined in Articles* About the Upper Gastrointestinal Tract in Psychosomatic Medicine Between 1939 and 2000**

<table>
<thead>
<tr>
<th>No. of Articles</th>
<th>Mean Year of Publication</th>
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<tbody>
<tr>
<td>9</td>
<td>1957</td>
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<td>15</td>
<td>1958</td>
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<td>6</td>
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<tr>
<td>6</td>
<td>1972</td>
</tr>
<tr>
<td>4</td>
<td>1977</td>
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* At least three articles.

![Fig. 4. Number of upper gastrointestinal articles in *Psychosomatic Medicine* addressing each principal underlying hypothesis: trends over time.](image1)

![Fig. 5. Number of upper gastrointestinal articles in *Psychosomatic Medicine* related to each of several biopsychosocial themes: trends over time.](image2)
The most striking finding of this review of upper gastrointestinal pathology in the pages of *Psychosomatic Medicine* is the rise and fall of interest in this subject since the magazine began publication. The number of research reports published per year has been dropping steadily since its peak in the 1960s, with a resurgence of articles in the past decade sustained largely by reviews and commentaries and in any case lagging behind an overall increase in the journal's size.

In attempting to account for this finding, one tempting explanation is that the discovery of the role of a bacterial agent in peptic ulcer, *H. pylori*, discouraged interest in psychological and social factors. The results of this review show, however, the entrance of *H. pylori* merely punctuates a decline that began more than 15 years earlier. The hand of the specific *PM* editor seems to have had a relatively limited influence.

If recent advances had demonstrated that ulcer has nothing to do with psychological factors, this would be a significant change in the field of medicine. However, the recognition that *H. pylori* infection is a major cause of peptic ulcer disease has not lead to a significant increase in research on the role of psychological factors in the development and maintenance of ulcers. The use of laboratory techniques has remained steadily high over time, whereas only two studies used a prospective epidemiologic approach.
an excellent explanation for the fall in research articles in *PM*, just as the discovery of chromosomal trisomy killed the literature examining family interactions as antecedents of Down syndrome. But this is not the case; though the thinking of most gastroenterologists has shifted in other directions, the empirical literature linking psychological factors to ulcer (reviewed in Ref. 4) has not only not been refuted but has actually increased in heft and credibility during the past decade.

One major factor in the downward slope was undoubtedly the appearance of modern antisecretory therapy toward the end of the 1970s in the form of cimetidine and other H₂-receptor blockers. As long as therapy toward the end of the 1970s in the form of cimetidine and other H₂-receptor blockers. As long as therapy

In fact, interest in peptic ulcer has fallen off not only in *Psychosomatic Medicine* but also, though to a lesser degree, in the medical literature as a whole (see “Results”), presumably in relation to the development of effective medical therapy and to a secular fall in the prevalence of ulcer in Western countries (5).

The drop-off of articles in *PM* may possibly involve a deflection of articles regarding mind-body interactions in upper gastrointestinal diseases toward other journals. Of articles on peptic ulcer with the subhead psychology listed in MEDLINE for 1960 to 1979, 4 of 35 (11.4%) appeared in *Psychosomatic Medicine*; for 1980 to 1999, only 2 of 164 (1.2%) were in *PM*. Of 44 original research reports published between 1980 and 1999 and cited in a recent review of psychosocial factors in peptic ulcer (4), 41 were published in medical or gastroenterological journals rather than psychiatric or psychosomatic ones. These findings arguably indicate a laudable diffusion of biopsychosocial thinking beyond the borders of the specialized community.

To a certain extent the rise and fall of ulcer research in *PM* can be seen as reflecting the parabola of a specific theory: the stress-acid theory of peptic ulcer. A first period was dominated by hypothesis generation using case studies and small laboratory studies to elaborate a theoretical model that included inherited characteristics, life stress, and especially patients’ inner experience in mediating increases in acid secretion.

The second period was devoted to quantitative research in complex human and animal models. In the most recent period research interest in ulcer was largely abandoned, replaced by theoretical papers and by exploration of new research topics related to motility and functional dyspepsia; the latter were the subject of only 1 of the 35 original investigations published in *PM* between 1960 and 1969 but 6 of the 9 published between 1990 and 1999.

The shift in interest toward functional conditions reflects a corresponding trend in the field of gastroenterology as a whole, and so do the changes in etiologic thinking. If ulcer pathogenesis is conceptualized in terms of a balance between aggressive factors and protective factors, for many decades emphasis was placed on the aggressive factors, chiefly gastric acid secretion. Since the 1970s the emphasis of gastroenterologists has largely shifted toward the importance of deterioration of mucosal protective factors by such factors as smoking, nonsteroidal anti-inflammatory drugs, and *H. pylori* infection. The psychosomaticist’s usual working model, which emphasized the ability of stress to increase duodenal acid load, thus became slightly outmoded in its emphasis though not necessarily incorrect in its substance.

The *PM* literature on upper gastrointestinal disorders has not shrunk from complexity and features pioneering studies of sophisticated multifactorial models (6) that consider interactions among personality traits, life stress, and gastric acid secretion. It has, however, largely ignored possible interactions of psychological factors with many other important ulcer risk factors, despite the fact that several of the latter (notably, smoking and the use of nonsteroidal anti-inflammatory drugs) are behavioral in nature and could therefore act as mediators between psychological factors and ulcer formation. The discovery of *H. pylori* could have stimulated *PM* researchers to examine the interactions between psychological and infectious factors, but thus far it has not. The failure to take major nonpsychosocial ulcer risk factors into account in *PM* articles provides a mirror image of the exclusive attention paid of late, in the broader biomedical community, to precisely those risk factors.

Also notable for their absence are epidemiologic studies. To skeptics some of the most convincing evidence that psychosocial factors influence peptic ulcer consists of prospective studies in human populations, because these can avoid recall bias by assessing psychosocial factors before the development of ulcer or before observing the course of established ulcers. Of the dozen or so such studies published in the medical literature (see Ref. 4), only one has appeared in *Psychosomatic Medicine*.
(6), reflecting the journal’s concentration on clinical case series, animal studies, and laboratory research.

In conclusion, articles on upper gastrointestinal topics in *Psychosomatic Medicine* have fallen off since the 1960s in relation to declines in ulcer prevalence, improvements in therapy, and the rise of novel etiologic models. Several temporal trends reflected those in Psychosomatic Medicine at large (eg, the rise of quantitative approaches), whereas others are specific to gastroenterology (eg, a recent surge of interest in functional disorders). The peptic ulcer literature in *Psychosomatic Medicine* represents a complete cycle of hypothesis generation, hypothesis testing, and conclusion drawing, with retrenchment into literature reviews and a falloff in original investigations when new views of etiology and effective nonpsychological treatment appeared. Several important potential research topics are notable for their scanty representation thus far in *Psychosomatic Medicine*: the interactions between psychological and infectious factors in the etiology of peptic ulcer; mediation of psychosocial effects on upper gastrointestinal disease through impact on behaviors such as sleeping and eating patterns and the consumption of cigarettes, alcohol, and nonsteroidal antiinflammatory drugs; psychologically oriented ulcer epidemiology with interpretation of temporal trends; reevaluation of the specificity hypothesis and of psychoanalytic insights into ulcer in terms of current etiologic concepts; gastroesophageal reflux disease; and the interaction between psychosocial and nonpsychosocial factors in the pathogenesis of nonulcer dyspepsia.

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**REFERENCES**