Temporal Changes in the Occurrence of Hemorrhoids in the United States and England

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Although numerous etiologic risk factors have been proposed, the pathogenesis of hemorrhoids remains unknown. The present investigation assesses the temporal distribution of hemorrhoids as depicted by physician visits, hospital discharges, and surgical procedures to provide further insight into potential etiologic risk factors. The analysis was based on five data sources: from the United States, the National Disease and Therapeutic Index (NDTI), the National Hospital Discharge Survey (NHDS), and the Commission on Professional Hospital Activities (CPHA); from England and Wales, the Morbidity Statistics from General Practice (MSGP) and the Hospital In-patient Enquiry (HIPE). Results demonstrated a consistent decline in all data sources from the United States. The decrease occurred in males and females similarly and was most striking in those aged 45–64 years. Physician visits and hospital discharges for hemorrhoids in England and Wales likewise declined although the decrease was not as dramatic. The consistency of the temporal distributions among the two countries, as well as among the different sources, suggests that the observed decline may, in fact, reflect an overall decrease in the occurrence of hemorrhoidal disease. [Key words: Hemorrhoids; Hemorrhoidectomy; Epidemiology; Time trends]

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Despite references to the presence of hemorrhoids in ancient cultures,[1,2] they are widely considered to be the result of modern civilization. This belief is based predominantly on studies by Burkitt[2–4] in the early 1970s in which he speculated that hemorrhoids were causally related to constipation, presumably due to a deficiency of dietary fiber. Specifically, he hypothesized that increased intra-abdominal pressure resulted from straining to pass hard stools leading to the development of hemorrhoids. Other investigators have similarly suggested that constipation and straining are important factors in the pathogenesis of hemorrhoids.[5,6] Recent epidemiologic and pathophysiologic studies, however, question the importance of constipation in the development of hemorrhoids.[7,8]

Although numerous potential etiologic risk factors have been proposed, the pathogenesis of hemorrhoids remains to be established. Previous epidemiologic studies have demonstrated distinct demographic and socioeconomic distributions which suggest the influence of environmental factors in the development of this disorder.[1,7,9] Elucidation of the temporal pattern of hemorrhoids may provide further insight into the nature of these environmental factors. The present investigation, using population-based surveys from the United States and from England and Wales, assesses the temporal distribution of hemorrhoids as depicted by physician visits, hospital discharges, and surgical procedures.

METHODS

Data Sources

The following population-based surveys were analyzed: from the United States, the National Disease and Therapeutic Index (NDTI), the National Hospital Discharge Survey (NHDS), and the Commission on Professional Hospital Activities (CPHA); from England and Wales, the Morbidity Statistics from General Practice (MSGP) and the Hospital In-patient Enquiry (HIPE). In the present analysis, use of the term hemorrhoids was based on code number 455 of the 9th revision of the International Classification of Diseases (ICD).[10] Data were not available, however, to allow for stratification of the temporal trends of hemorrhoids by subtype, *i.e.*, internal or external.

Physician Visits

National Disease and Therapeutic Index (NDTI). The NDTI reports annual statistics on physician visits for various diseases. The NDTI was

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established in 1958 and is based on a panel of office-based physicians from different specialties throughout the United States. Each participant lists every patient he or she sees in a 48-hour sampling period. In addition to the patient's diagnosis, demographic data are collected including age and sex of the patient. Data accumulated from a panel of 2,130 different physicians over a 3-month period are extrapolated to a national level. Quarterly statistics are combined to form annual statistics. For the present study, first and subsequent visits were analyzed together for the period of 1958–1986.

Morbidity Statistics from General Practice (MSGP). Data regarding visits for various conditions in England and Wales have been collected for the MSGP in three national studies, the first in 1952–53, the second in 1971–72, and the most recent in 1981–82. The initial study comprised 100 physicians. Subsequent studies have involved over 140 physicians with a sample population of 250,000 patients. Physicians record the age and sex of patients seen, the main reason for visiting, and whether it is the initial or follow-up evaluation. For analysis of the time trends of physician visits for hemorrhoids in England and Wales, data from all three surveys were evaluated.[11–13] In order to be comparable with the NDTI, both initial and follow-up visits were considered.

Hospital Discharges

National Hospital Discharge Survey (NHDS). In the United States, hospital discharge data have been collected in the NHDS and are available from 1965 to 1987. The NHDS sample contains 200,000 randomly selected medical records from over 400 short-stay, nonfederal hospitals. All hospitals with 1,000 beds or more are included in the sample. The remaining hospitals are stratified by ownership, geographic distribution, and size. Information is available for diagnosis coded according to the International Classification of Diseases (ICD) code, surgical procedures, and demographic data including age, sex, and geographic location of the hospital. For the present study, unpublished discharge diagnosis and surgical procedure data covering the period 1970–1987 were available through computer tapes from the National Center for Health Statistics. Hospital discharges for a primary or secondary diagnosis of hemorrhoids were examined separately. The specific procedures analyzed were hemorrhoidectomy (code 49.46) and all other hemorrhoid procedures (codes 49.40–49.45 and 49.47–49.49).

Hospital In-patient Enquiry (HIPE). Age- and sex-specific breakdowns of hospital discharges for the diagnosis of hemorrhoids in England and Wales were obtained from the Office of Population Censuses and Surveys covering the period of 1959–1985. From its inception until 1979, the HIPE was based on a 1-in-10 sample of discharges from National Health Service Hospitals in England and Wales. The diagnosis selected for HIPE tabulations was the main diagnosis treated or investigated during the hospitalization. Since 1979, a sample of private patients has been included into the survey, with private patients composing approximately 1 percent of the total sample. Unlike the NHDS, however, surgical procedural information from HIPE was unavailable.

Surgical Procedures

Commission on Professional Hospital Activities (CPHA). In addition to NHDS data, procedural data were analyzed from the CPHA, which solicits discharge and surgical procedural information from a cross-section of 1,200 U.S. hospitals. The annual sample comprises 2 million patient records. Hospitals in the sample are stratified by number of beds, ownership, teaching status, and census region in an attempt to obtain as representative a sample as possible. Projection factors are applied to extrapolate the sample to national estimates. The period of data collection began in 1955. For the present study, all hemorrhoid procedures (ICD code 49.4) were examined during the period 1980–1987.

Statistical Analysis

Rates per 100,000 population of the same age, sex, and country of origin were calculated for physician visits, hospital discharges, and surgical procedures. In calculating specific rates, the number of physician visits for hemorrhoids, inpatients discharged with hemorrhoids, or surgical procedures for hemorrhoids occurring during 1 year were divided by the pertinent fractions of the population at risk at midyear, in either the United States or England and Wales. For example, age-specific hospital discharge rates secondary to hemorrhoids in the NHDS were calculated by dividing the annual number of discharges for hemorrhoids in each age

group by the corresponding age-specific number of United States residents. NDTI rates were expressed as the average of five consecutive years to account for statistical fluctuations in their annual rates. Age- and sex-specific population distributions were obtained from the Current Population Reports of the United States Bureau of the Census[14,15] and from the Office of Population Censuses and Surveys.

To account for the changing age distribution of the population between 1959 and 1987, the crude annual or 5-year rates were adjusted to the age distribution of the populations in the United States or England and Wales during 1980 by the method of direct standardization.[16] For example, to standardize the crude rate of 1970, the age-specific hospital discharge rates of this year were multiplied by the corresponding age groups of the 1980 population. The sum of products yielded the number of discharges that would have been expected in 1970 if this population had the same age distribution as the 1980 standard. The expected number of discharges secondary to hemorrhoids was then divided by the total population of 1980, yielding an age-adjusted hospital discharge rate.

RESULTS

Physician Visits

According to NDTI statistics, the annual average rate of physician visits for the diagnosis of hemorrhoids was 1,177 per 100,000 United States population. Stratification by age revealed a peak rate in those aged 40–64 years, with a subsequent decline after age 65. Physician visits were slightly more common in males than in females, demonstrating rates of 1,249 and 1,166 per 100,000 population, respectively (Table 1). MSGP data demonstrated an overall rate of 1,123 physician visits per 100,000 population of England and Wales. Again, physician visits peaked in those aged 45–64 years, with a decline after age 65. In contrast to the United States, physician visits for hemorrhoids in England and Wales were slightly more common in females than in males (Table 1). Both sexes demonstrated similar age distributions.

Evaluation of the time trends of physician visits for hemorrhoids during the period 1960–1985 revealed a progressive decline, falling by nearly 50 percent (Fig. 1). A parallel decline in physician visit rates occurred in both males and females. Although evident in all age groups, the decrease was most striking in those aged 40–59 years (Fig. 2). A similar, though less striking, decline was also observed in England and Wales (Fig. 1). A breakdown of MSGP time trends by sex revealed a much larger decrease in physician visits for hemorrhoids in males than in females.

Hospital Discharges

In the United States, an annual average of 112,000 patients were discharged from civilian, nonfederal, short-stay hospitals with the primary diagnosis of hemorrhoids, which corresponds to a rate of 48 per 100,000 United States population (Table 1). As with physician visits, hospital discharge rates for hemorrhoids were highest in those aged 45–64 years. Hospital discharges for hemorrhoids, however, were decidedly more common in males than in females. HIPE data revealed analogous hospital discharge rates in England and Wales. Peak rates were seen in those aged 45–64 years, and discharges for hemorrhoids were again more common in males than in females (Table 1).

Table 1.
Rates of Physician Visits, Hospital Discharges, and Surgical Procedures for Hemorrhoids by Age and Sex in the United States and England

	Physician Visits		Hospital Discharges		Surgical Procedures	
	NDTI*	MSGP	NHDS	HIPE	CPHA	NHDS
Total	1,177	1,123	47.65	40.69	60.24	48.65
<15	70	33	0.77	0.51	0.39	0.59
15–44	1,232	1,323	46.40	36.45	57.16	49.58
45–64	2,108	1,580	89.38	77.16	122.92	95.14
65+	2,093	1,465	72.09	52.88	82.56	61.60
Males	1,249	1,050	53.77	47.69	67.85	54.46
Females	1,166	1,190	41.92	34.05	53.03	43.21

* Age groups for NDTI data are 0–19, 20–39, 40–64, and 65+ as the data provided were not stratified into the same age groups as in the other surveys. Rates are expressed per 100,000 population of the same age, sex, and country.

During the period 1974–1987, hospital discharge rates for hemorrhoids in the United States declined dramatically, falling by nearly threefold from a peak rate of 104 per 100,000 in 1974 to a low of 36 per 100,000 in 1987. The decrease did not appear to be related to gender as discharge rates of both males and females declined in parallel. Stratification by age revealed the sharpest drop in those aged 45–64 years, with similar but less marked decreases in those aged 15–44 and those aged 65 and older (Fig. 3). Likewise, stratification of discharges into primary or secondary diagnoses of hemorrhoids demonstrated a decline in both (Fig. 4). Despite the increase in the number of secondary diagnoses between 1979 and 1980, the overall trend generally paralleled the trend of primary diagnoses of hemorrhoids.

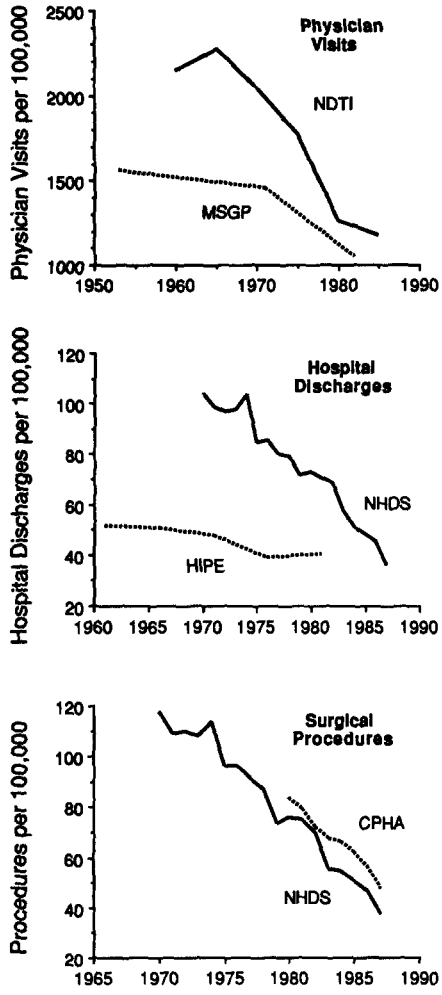

Figure 1. Time trends of physician visits (top), hospital discharges (middle), and surgical procedures (bottom) for hemorrhoids from 1953 to 1987. Rates are expressed per 100,000 population of the United States (NDTI, NHDS, CPHA) or of England and Wales (MSGP, HIPE) and have been adjusted to the age distribution of the 1980 population of each country.

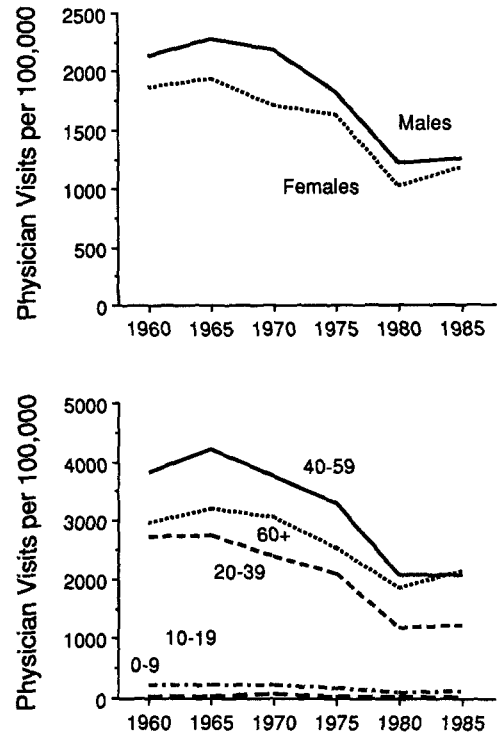

Figure 2. Time trends of physician visits for hemorrhoids in the United States by sex (top) and age (bottom). Rates are expressed per 100,000 United States population and have been adjusted to the age distribution of the 1980 census population.

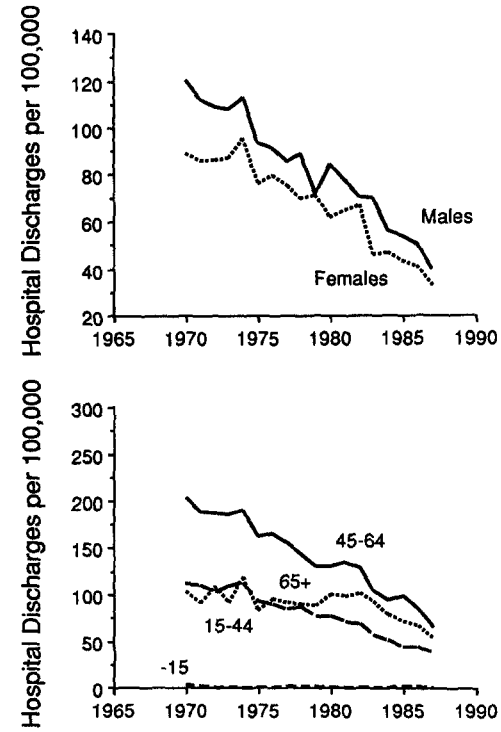

Figure 3. Time trends of hospital discharges for a primary diagnosis of hemorrhoids in the United States by sex (top) and age (bottom). Rates are expressed per 100,000 United States population and have been adjusted to the age distribution of the 1980 census population.

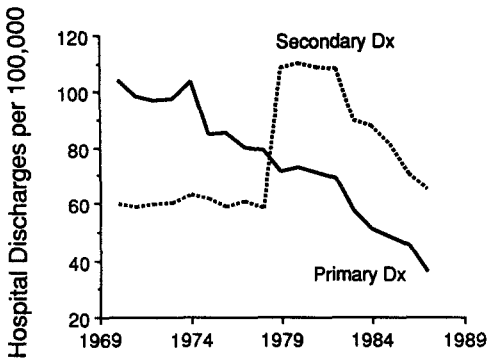

Figure 4. Time trends of hospital discharges for a primary or secondary diagnosis (Dx) of hemorrhoids in the United States from 1970 to 1987. Rates are expressed per 100,000 United States population and have been adjusted to the 1980 census population.

HIPE data demonstrated a less striking decline in the overall rate of hospital discharges for hemorrhoids falling from a rate of 52 per 100,000 to 41 per 100,000 population (Fig. 1). With regard to sex, discharge rates for males declined by almost 33 percent, while discharge rates for hemorrhoids in females remained essentially unchanged. The sharpest decline occurred in those aged 15–44 years, while discharge rates for those under age 15 and over age 65 remained stable.

Surgical Procedures

Only surgical procedural data from the United States were available for the present analysis. Both the NHDS and CPHA revealed identical age and sex distributions (Table 1). According to data from the NHDS, an annual average of 49 hemorrhoidectomies per 100,000 United States population were performed during the period 1983–1987. Hemorrhoidectomies were performed 1.3 times more commonly in males than in females. The peak rate of hemorrhoidectomies was observed in those aged 45–64 years. Data from the CPHA demonstrated a somewhat higher rate of hemorrhoidectomies during the same time period, but otherwise identical age and sex distributions (Table 1).

The temporal trends of surgical hemorrhoid procedures mirrored the trends of physician visits and hospital discharges in the United States. A threefold decrease in hemorrhoidectomies was observed in NHDS data, declining from a peak of 117 per 100,000 in 1974 to a low of 37 per 100,000 in 1987 (Fig. 1). When hemorrhoidectomies (ICD code 49.46) were excluded, the time trends of all other hemorrhoidal procedures (ICD codes 49.40–49.45 and 49.47–49.49) revealed a slight increase from a rate of 1.9 per 100,000 United States population in 1979 to a rate of 3.4 hemorrhoidal procedures per 100,000 population in 1987. CPHA data demonstrated a similarly marked decline in the total number of hemorrhoidal procedures (Fig. 1). Declines were similar in males and in females between surveys.

DISCUSSION

The time trends of hemorrhoids can be summarized as follows. Over the past 25–30 years, physician visits, hospital discharges, and surgical procedures for hemorrhoids in the United States have decreased markedly. This decline occurred in males and females similarly and has been most striking in those aged 45–64 years. Physician visits and hospital discharges for hemorrhoids in England and Wales have likewise declined although the decrease has been less dramatic.

The surveys analyzed in the present study were selected because they all represented population-based statistics. In the design of these surveys, a representative sample of the entire country, either the United States or England and Wales, was obtained to eliminate potential geographic biases introduced in smaller regional surveys. In addition, the data sources provided the advantage of three different measures for the occurrence of hemorrhoids. To ensure the validity of the diagnosis of hemorrhoids, only statistics based on physician coding were analyzed since the patients themselves may mistake other anorectal conditions for hemorrhoids. Likewise, the strength of hospital discharge and surgical procedure data relates to their reliability. Diagnoses and procedural information were taken directly from the patients' records. The data, however, may have been limited by incomplete physician response rates (NDTI or MSGP) or incomplete hospital discharge records (NHDS, CPHA, or HIPE).

It is clear from NHDS data that the number of hemorrhoidal surgeries has declined dramatically over the past 20 years. It may be argued that the decline has been the result of an increase in alternative treatment modalities. Over the past 30 years, rubber-band ligation, cryotherapy, thermal therapy, and lasers have become increasingly popular in the treatment of hemorrhoids.[17] These procedures are often performed in gastrointestinal laboratories, outpatient surgery departments, or freestanding surgical centers which are incompletely sampled

by the NHDS. The NHDS rates of these alternative hemorrhoidal procedures increased only minimally during the same time period. The relatively small increase was insufficient to account for the marked decline in surgical hemorrhoidectomies. The rate of all hemorrhoidal procedures has also declined as shown by data from the CPHA. The decline in hospital discharges for a primary diagnosis of hemorrhoids is most likely a reflection of the decrease in surgical procedures. The rate of hospital discharges and the rate of surgical hemorrhoidectomies in the NHDS are nearly identical, suggesting that the majority of patients admitted with a primary diagnosis of hemorrhoids were admitted for a surgical procedure. Alternatively, it may be speculated that the observed decrease has been influenced by the implementation of Diagnostic Related Groups (DRGs) for reimbursement. The decline in hospitalizations for hemorrhoids, however, began prior to the onset of DRGs in 1984. Furthermore, since 1980 the rate of hospital discharges for a secondary diagnosis of hemorrhoids has also declined, suggesting that the overall decrease was not due only to a drop in the number of surgical procedures. The observed decline in physician visits for hemorrhoids may reflect in part an increase in the use of over-the-counter medications. Instead of presenting to their physician for evaluation and treatment, patients may have self-medicated with over-the-counter hemorrhoidal preparations. It would seem most likely, however, that the observed decline in all statistics was the result of a combination of factors, including an increased reliance on medical treatment with stool softeners and fiber supplements, a more frequent use of alternative treatment modalities, and an overall decrease in the occurrence of hemorrhoids.

A general increase in dietary fiber ingestion would be one possible explanation for an overall decrease in hemorrhoids. If Burkitt's[3,4] hypothesis was correct, increased dietary fiber could result in softer stools and less straining, thus leading to a decrease in the occurrence of hemorrhoids. Analysis of the time trends of dietary fiber ingestion, both in the United States and in England and Wales, however, reveals virtually no change in the intake of dietary fiber during the period 1960–1985.[18] The marked decrease in hemorrhoids, despite a relatively stable trend in fiber intake, further questions the importance of constipation in the pathogenesis of hemorrhoids. One can envision a number of other potential causes for a decline in the occurrence of hemorrhoids. Since 1960, the rate of live births in the United States has declined steadily.[19] Whereas hemorrhoids frequently occur in pregnant women, the decline in the number of pregnancies could partially account for the decrease in hemorrhoids. However, this would not explain the decline in hemorrhoids observed in males. Likewise, sedentary lifestyle is thought to be a risk factor for the development of hemorrhoids.[9] The recent emphasis on exercise and physical fitness may also have contributed to the decrease in hemorrhoids. However, with the multitude of hypothesized risk factors for the development of hemorrhoids, it is unlikely that a single factor was responsible for the observed decline. More plausible is a modulation of several risk factors. Whether this involved a decrease in the influence of specific risk factors, the emergence of protective factor(s), or the combination of both remains unknown but provides fertile ground for further research.

In conclusion, the occurrence of hemorrhoids both in the United States and in England and Wales appears to have progressively declined over the past 30 years. The reason for this decline remains speculative. Previous studies have demonstrated characteristic demographic and socioeconomic distributions of hemorrhoids suggesting the influence of environmental factors in the pathogenesis of hemorrhoids. The present study further defines the epidemiology of hemorrhoids by revealing a distinct temporal trend which may provide additional insight into the pathogenesis of this common disorder.

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Editorial Comment

The authors have taken on an extraordinarily difficult task in this and an earlier companion publication,[1] assessing the prevalence of hemorrhoids, a "disease" wherein physical findings often do not correlate with symptom severity. Many other anorectal conditions simulate hemorrhoidal symptoms, and a certain degree of sophistication is required to differentiate fissure from pruritus from hemorrhoids from Crohn's disease from cancer.[2] Patients are totally lacking in this sophistication (making self-reporting surveys of diagnosis often a compendium of all the above diagnoses, with hemorrhoids probably predominating), and, sadly, so are many physicians. Virtually every patient I see with fissure-in-ano or pruritus ani is referred with the diagnosis of hemorrhoids. In addition, factors other than symptoms alone may determine whether a patient seeks medical advice[3] for what is, to a certain degree, a functional complaint. It is, therefore, not surprising that reported prevalence rates have varied widely from 1 to 86 percent, depending on the method of ascertainment[1,4–8] and, of course, definition, which is problematic.

There is good reason to predict that the American data sources described in this paper would report that the prevalence of hemorrhoids would decrease in recent years, even if the actual prevalence has remained unchanged. The National Disease and Therapeutic Index is a survey, based on physician visits of private practitioners only, and perhaps with a bias toward those visits in which prescriptions are written. The growth of the public sector in medicine (wherein lies the greatest prevalence of hemorrhoids) and proliferation of over-the-counter hemorrhoidal medications, including the availability of creams containing steroids and anesthetics,

thus encouraging the self-medication of symptoms by patients, would tend to show a declining trend in prevalence in this data source. The Hospital Discharge Survey and Commission of Professional Hospital Activities would both show a declining prevalence because of the growth of outpatient surgery and popularity of nonsurgical methods of mucosal fixation such as sclerotherapy, rubber-band ligation, and various new technologies. The authors, though acknowledging these shortcomings, I believe, underestimate this trend.

Two data sources are not included in this report, the Health Interview Survey, a self-reported population survey of symptoms and supposed diagnoses, and Ambulatory Care Survey, a survey of physician office visits, of the National Center for Health Statistics.[6,7] Though the accuracy of these data are as suspect as those presented within the report by Johanson and Sonnenberg for reasons described above, they are in general agreement, and it would be interesting to see time trend data for them as well.

Despite these objections, the authors clearly did the best they could with the data that were available to them. Whether the phenomenon of declining prevalence is real is still open to question. There is good reason to assume that it is not real, but let us accept their premise for the moment. What might this mean? The movement of certain populations (spatially or temporally) into a "Western" lifestyle has resulted in the appearance of many diseases that are regarded as unique to this environment such as heart disease, stroke, diabetes, gallstones, hypertension, peptic ulcer, appendicitis, cancer, and hemorrhoids. Because of variations in prevalence, it is believed that each disease is preventable, yet the specific strategies for prevention for each disease remain obscure. Few epidemiologists have taken on the global analysis of all these diseases in the context of "Westernization," but it is interesting that most of the above diseases (except colorectal cancer) have shown a declining incidence in recent years in the United States.[9] Are we adapting to our environment, or, put another way, can we let prevention take care of itself?

Benign diseases of the anal canal such as hemorrhoids, fissure-in-ano and fistula-in-ano (known collectively as benign anorectal disease or BAD) still occur very frequently in the United States. Though not major causes of mortality, they are major causes of medical morbidity and health care cost. From the demographic data cited, it can be estimated that the cost of treating BAD in the United States exceeds 2 billion dollars annually. Though newer modalities of diagnosis and treatment of BAD have been developed, aside from outpatient surgery, these modalities (such as colonoscopy and laser surgery) have done little to reduce the prevalence and cost of these illnesses. In fact, the opposite has occurred. Because of the high frequency of proximal colorectal disease, particularly cancer, patients who develop symptoms in the anal canal, such as bleeding, will continue to need diagnostic evaluation of the colon, adding cost and risk to screening programs for colorectal cancer. It is also unlikely that the treatment of BAD will become less costly or risky, as nonsurgical, inexpensive, and effective office treatments of hemorrhoids already are commonly used, and fissure and fistula will continue to be surgical illnesses. Therefore, the most promising means of reducing the cost and morbidity of anorectal disease is to identify high-risk groups and to define exogenous risk factors, the modification of which may lower the prevalence of these diseases.

Surprisingly, this has not been rigorously done.

Table 2.
Suggested Risk Factors for Hemorrhoids

Anatomic abnormality	Habits	Passions
Heredity	Pregnancy	Sedentary life
Temperament	Diarrhea	Tight lacing
Body habitus	Cathartic abuse	Anal spasm
Climate	Diet	Sphincter atony
Seasons	Enemas	Suppositories
Age	Constipation	Vaginal pessaries
Sex	Puerperal state	Anorectal irritation
Water consumption	Alcohol consumption	Obesity
Railroading	Horseback riding	Upright posture
Tight clothing	Income	Education
Customs (adapted from Smith[10])	Portal vein obstruction	

Many risk factors for hemorrhoids have been hypothesized, as can be seen in Table 2. Directions for further research are suggested by this descriptive time trend study. However, investigative epidemiology must be done to make real inroads into the prevalence of this illness.

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