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The Prevalence of Hemorrhoids and Chronic Constipation

An Epidemiologic Study

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Hemorrhoids are a frequently occurring disorder widely believed to be caused by chronic constipation. In the present study, the epidemiology of hemorrhoids was evaluated and compared with the epidemiology of constipation. The analysis was based on 4 data sources: from the United States, the National Health Interview Survey, the National Hospital Discharge Survey, and the National Disease and Therapeutic Index; from England and Wales, the Morbidity Statistics from General Practice. Results showed that 10 million people in the United States complained of hemorrhoids, corresponding to a prevalence rate of 4.4%. In both sexes, a peak in prevalence was noted from age 45–65 yr, with a subsequent decrease after age 65 yr. The development of hemorrhoids before age 20 yr was unusual. Whites were affected more frequently than blacks, and increased prevalence rates were associated with higher socioeconomic status. This was in contrast to the epidemiology of constipation, which demonstrated an exponential increase in prevalence after age 65 yr and was more common in blacks and in families with low incomes or low social status. The data presented illustrate differences in the epidemiologic behavior of hemorrhoids and constipation, calling the presumption of causality between constipation and hemorrhoids into question.

The occurrence of hemorrhoids can be traced back to antiquity. Hemorrhoids have been referred to in literature dating back to the pre-Christian era (1), and proctology thrived in Ancient Egypt (2). In the centuries that have followed, numerous possible etiologies for hemorrhoids have been proposed (3–8). The multiplicity of different mechanisms suggests that no single theory adequately explains the pathophysiologic changes associated with hemorrhoids. In the early 1970s, Burkitt popularized the theory that constipation represented a major etiologic risk factor for hemorrhoids (1,9,10). His theory has subsequently become widely accepted.

Analysis of the epidemiology of hemorrhoids may provide additional insight into the etiology of hemorrhoids. Previous studies assessing the prevalence of hemorrhoids were confined to small populations from single hospitals or geographic regions. These studies were based on retrospective record review (11) or surveys distributed among hospitalized patients (2,12). A detailed description of the demographic behavior of hemorrhoids has not been completed. The epidemiology of hemorrhoids in the total population and its impact on hospitalization and physician visits have not been examined. Furthermore, the association of hemorrhoids and constipation has not been evaluated. This study analyzes the age, sex, racial, socioeconomic, and geographic distributions of hemorrhoids in the United States and in England and Wales using 4 large, population-based data files. In addition, the epidemiologic pattern of hemorrhoids is contrasted with that of constipation.

Methods

General Outline

The epidemiology of hemorrhoids and constipation was evaluated in the following surveys: the National Health Interview Survey (NHIS), the National Hospital Discharge Survey (NHDS), the National Disease and Therapeutic Index (NDTI), and the Morbidity Statistics from General Practice (MSGP) from England and Wales. NHIS data were

Abbreviations used in this paper: **MSGP, Morbidity Statistics from General Practice; NDTI, National Disease and Therapeutic Index; NHDS, National Hospital Discharge Survey; NHIS, National Health Interview Survey.**

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analyzed to determine age-, sex-, race-, region-, and income-specific prevalence rates of hemorrhoids and constipation. Hospitalization (NHDS) and physician visit (NDTI) data provided additional statistics regarding the occurrence of hemorrhoids in the United States. Physician visit data from the MSGP furnished information on the prevalence of hemorrhoids and constipation in England and Wales and were used to compare the epidemiologic patterns of hemorrhoids and constipation between the two countries.

National Health Interview Survey

The NHIS reports the prevalence of selected acute and chronic conditions by age, sex, race, and other demographic characteristics. The survey was begun in 1957 and has been conducted annually since then. From a nationwide sample of households, health information and other demographic characteristics of each household member are collected. One sixth of the subjects in this sample are asked questions related to digestive conditions. Each annual sample, which contains more than 100,000 persons, is extrapolated to a national level. A detailed description of the methodology of data collection and its statistical analysis has been published by the National Center for Health Statistics (13). For the present analysis, surveys from 1983–1986 were analyzed (14–17).

National Hospital Discharge Survey

The NHDS reports the use of hospitals coded by both diagnoses and demographic characteristics. Data have been collected on an annual basis since 1965. The sample contains 200,000 randomly selected records from more than 400 short-stay, nonfederal hospitals. All hospitals with 1000 or more beds are selected. The remaining hospitals are stratified by type of ownership, geographic division, and size. Demographic information includes age, sex, and geographic location of the hospital. The design of the NHDS has been described in a previous publication (13). For the present study, surveys from 1983–1985 were analyzed (18–20).

National Disease and Therapeutic Index

The NDTI, which reports annual statistics on physician visits for various diseases, is compiled by the Institute of Medical Statistics and was established in 1958. It is based on a panel of office-based physicians from different specialties throughout the United States who list each patient they see in a 48-h sampling period. Each patient's diagnosis, any products prescribed, and whether the patient underwent surgery is reported. Demographic data collected include the age and sex of the patient, where the patient is seen (office, hospital, home, etc), whether it is the first or a subsequent visit, and whether the patient was referred by another physician. Data accumulated from a panel of 2130 different physicians over a 3-mo period are extrapolated to a national level. Quarterly statistics are combined to form annual statistics. For the present study, data was analyzed for 1983–1986.

Morbidity Statistics From General Practice

Data regarding physician visits for various conditions in England and Wales have been collected for the MSGP in 3 national studies, the first in 1955–56, the second in 1970–71, and the most recent in 1981–82. The initial study comprised 100 physicians. Subsequent studies have involved more than 140 physicians with a sample population of 250,000 patients. Physicians record the age and sex of each patient seen, the main reason for the visit, and whether the visit is an initial evaluation, a follow-up evaluation, or a consultation. For analysis of the age and sex distribution of hemorrhoids and constipation, data from the third national study (1981–82) were used (21). Statistics from the second national study (1970–71) were used for evaluation of the socioeconomic distribution of hemorrhoids (22). For comparison of socioeconomic status, the population of England and Wales is stratified into 6 social classes: class I, professional occupations; class II, managerial and lower professional occupations; class IIIN, nonmanual skilled occupations; class IIIM, manual skilled occupations; class IV, partly skilled occupations; class V, unskilled occupations.

Statistical Analysis

Average annual rates of prevalence, hospital discharge, and physician visits stratified by age, sex, race, region, and socioeconomic status were calculated for 1983–1986 using data from the NHIS, NHDS, and NDTI. In calculating specific rates, the numbers of U.S. residents with hemorrhoids, inpatients discharged with hemorrhoids, or physician visits for hemorrhoids were divided by the pertinent fractions of the U.S. population. For example, age-specific prevalence rates of hemorrhoids were calculated by dividing the number of persons with hemorrhoids in each age group by the age-specific number of the U.S. population. Age-, sex-, and race-specific distributions of the U.S. population were obtained from the Current Population Reports of the U.S. Bureau of the Census (23,24). Weighted average values for 1983–1986 were determined to account for statistical fluctuations in the annual rates.

Standard errors of the mean were determined for prevalence, hospital discharge, and physician visit rates. In the NHIS and NHDS, regression techniques were applied by the statisticians of the National Center for Health Statistics to produce equations from which the standard error could be approximated. Because standard errors for the weighted averages could not be calculated, standard errors were determined for 1986 and applied to the average rates. In the NDTI, the standard error was calculated as $SEM = f \cdot \sqrt{n}/POP$, where n represented the actual number of physician visits for hemorrhoids during 4 consecutive years 1983–1986, f represented the factor used to extrapolate from the visits in the sample of physicians to a national level, and POP represented the total U.S. population during the same period. The standard error for physician visits from the MSGP was calculated similarly. The 95% confidence intervals were determined by multiplying the standard error by 1.96. Statistical significance of the difference between any 2 rates was evaluated by unpaired t-test. A χ^2 test was used to compare the age distribution of hemorrhoids and constipa-

Table 1. Regional Distribution of Hemorrhoids in the United States[a]

Region	NHIS (prevalence rate per 1000)	NDTI (physician visits per 1000)	NHDS (hospital discharges per million)
Northeast	32 ± 4	13.9 ± 0.5	12.5 ± 1.4
Midwest	45 ± 5	11.2 ± 0.4	13.0 ± 1.4
South	45 ± 4	11.6 ± 0.3	15.7 ± 1.3
West	44 ± 5	12.0 ± 0.5	8.8 ± 1.1
United States	44 ± 2	12.0 ± 0.2	12.9 ± 0.5

[a]All rates provided are weighted averages for the years 1983–1986 ± SEM.

tion. Prevalence rates of hemorrhoids and constipation were correlated with social class using the Spearman rank correlation coefficient. The statistical significance of the correlation coefficients was determined by unpaired *t*-test (25).

Results

Prevalence of Hemorrhoids

Ten million people in the United States complained of hemorrhoids, corresponding to a prevalence rate of 4.4% (95% confidence interval, 4.2%–4.6%) (17–20). Of these, approximately one third presented to physicians for evaluation, and an average of 1.5 million prescriptions were written annually for hemorrhoidal preparations. Although hemorrhoids were common, they rarely led to significant morbidity. Hospitalization for hemorrhoids occurred in only 12.9 (12.4–13.4) per million population (Table 1).

Distribution by Age, Sex, and Race

The age distribution of hemorrhoids demonstrated a hyperbolic pattern with a peak between age 45 and 65 yr and a subsequent decline after age 65 yr (Figure 1). The presence of hemorrhoids in patients aged <20 yr was unusual. This pattern was similar for all measures of occurrence, i.e., prevalence, physician visits, and hospital discharges. By contrast, constipation was common in children, declined in frequency in middle age, and increased exponentially after age 65 yr (Figure 1). The two age distributions were significantly different when tested by χ^2 ($p < 0.001$).

Male and female subjects demonstrated similar hyperbolic age distributions. No significant difference was evident in the occurrence of hemorrhoids between the sexes. According to statistics from the NDTI and NHDS, hemorrhoids were slightly more common in male than female subjects. In the NHIS and the MSGP, hemorrhoids were more common in female than male subjects.

Comparison of age-specific prevalence rates of hemorrhoids between whites and blacks again demonstrated hyperbolic age distributions (Figure 2). The overall prevalence of hemorrhoids was 1.5 times greater in whites than in blacks ($p < 0.01$). This difference was observed in all age categories (Figure 2).

Distribution by Geographic Region

Hemorrhoids were 1.3 times more common in rural than urban areas ($p < 0.05$), occurring in 51 (41–61) per thousand persons residing in rural areas and 39 (32–46) per thousand persons living in cities. Table 1 illustrates the regional distribution of hemorrhoids in the United States. These data bases yield contrasting information about the regional prevalence of hemorrhoids. Prevalence data from the NHIS showed a different pattern than physician visit data from the NDTI, which again demonstrated a different pattern than hospital discharge data from the NHDS.

Distribution by Socioeconomic Status

Analysis of MSGP data demonstrated a significant difference in the occurrence of hemorrhoids related to socioeconomic status. Hemorrhoids were 1.8 times more common in the highest than in the lowest

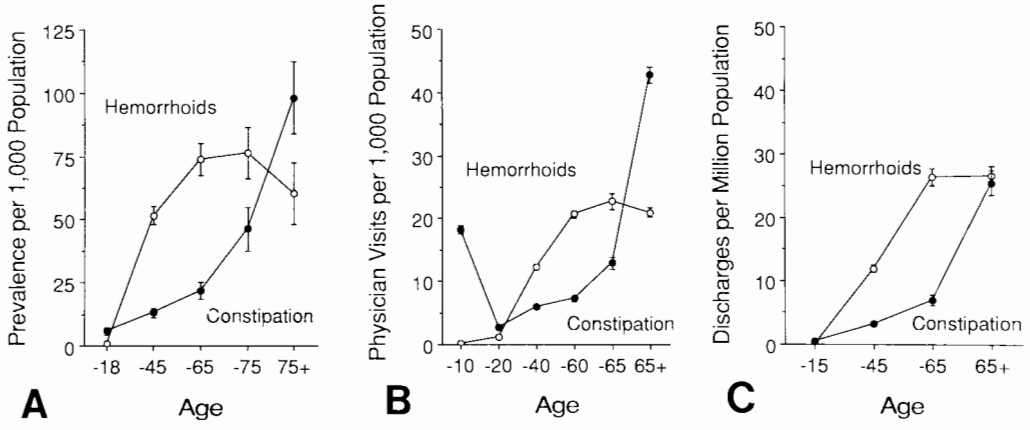

Figure 1. Age-specific occurrence of hemorrhoids and constipation in the United States. Data are from the NHIS (*A*), NDTI (*B*), and NHDS (*C*). Prevalence and physician visits are represented as average rates ± SEM per 1000 civilian noninstitutionalized U.S. residents from 1983–1986. Hospitalizations are represented as an average rate per million residents from 1983–1985 for all listed diagnoses.

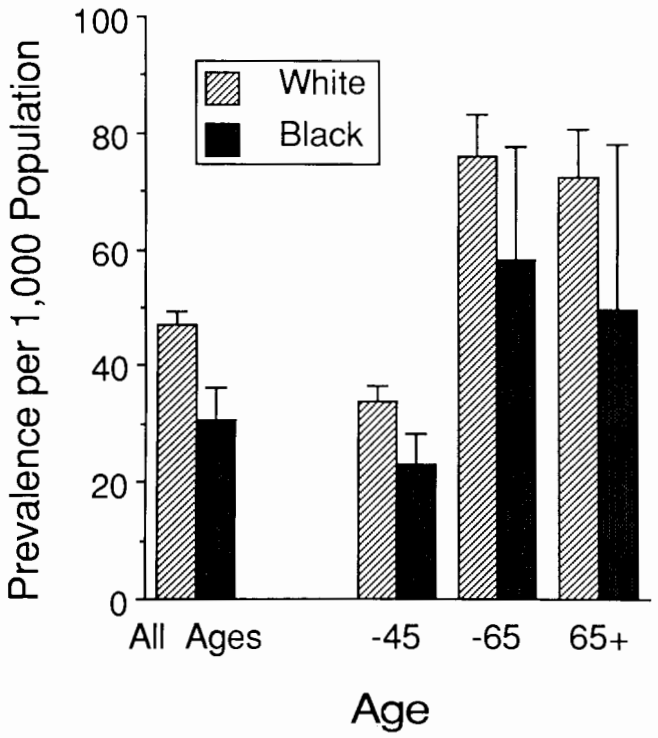

Figure 2. U.S. prevalence of hemorrhoids by age and race determined from NHIS data. Prevalence is given as average rate during the period from 1983–1986 ± SEM.

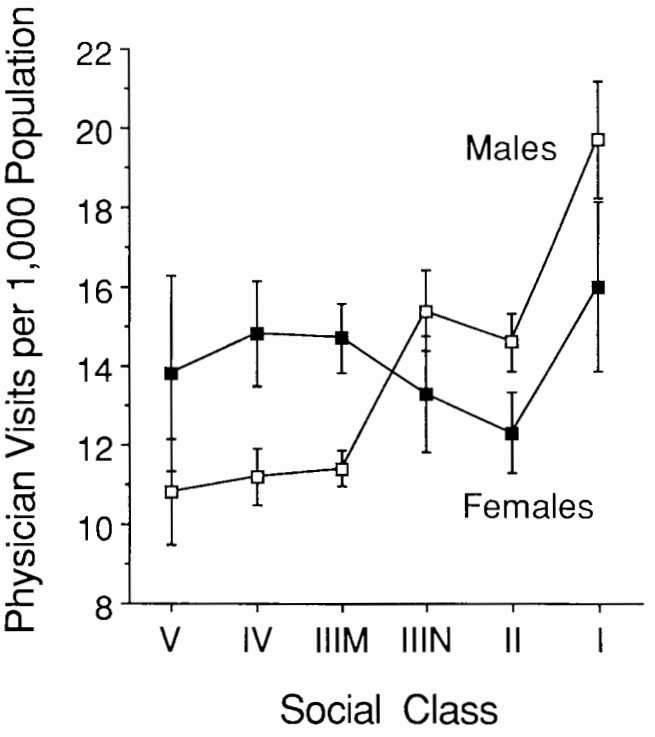

Figure 4. Physician visits due to hemorrhoids by social class in England and Wales from the MSGP. Married women were classified by their husbands' social class.

social class ($p < 0.002$). The prevalence of hemorrhoids was significantly correlated with increasing social class ($r = 0.943$, $p < 0.01$) (Figure 3). In married women categorized by their husbands' social classes, no correlation between the presence of hemorrhoids and social class was found (Figure 4). The association of hemorrhoids with socioeconomic status was less clear in data from the NHIS. No difference was observed between the different income groups. In contrast to hemorrhoids, the prevalence of constipation was inversely correlated with social class ($r = -0.943$, $p < 0.01$), showing a marked decline asso-

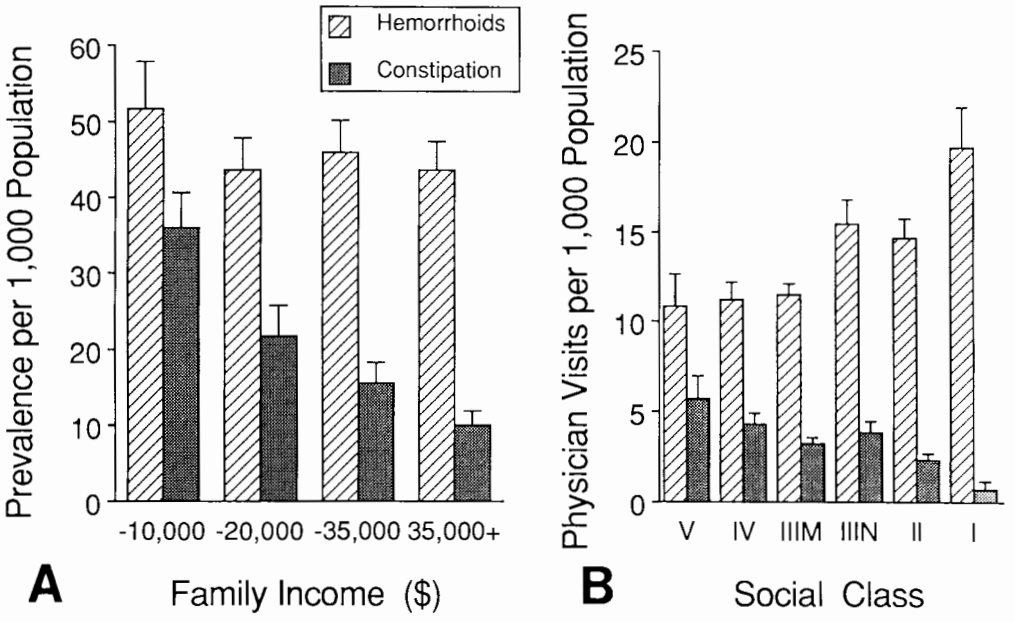

Figure 3. Socioeconomic variation of hemorrhoids and constipation by annual income of head of the family (*A*. United States) and by social class (*B*. England and Wales). Prevalence rates by income from the NHIS represent the average ± SEM of 1983–1986. Social class data obtained from the MSGP.

ciated with increasing socioeconomic status. This pattern was seen both in the United States and in England and Wales (Figure 3). Men and women categorized by their husbands' social classes showed parallel declines in constipation with increasing socioeconomic status.

Discussion

The demographic characteristics of hemorrhoids can be summarized as follows. Ten million people in the United States complained of hemorrhoids, corresponding to an overall prevalence rate of 4.4%. Hospitalizations resulting from hemorrhoids were uncommon. The age distribution of hemorrhoids demonstrated a hyperbolic pattern with a peak prevalence in subjects aged 45–65 yr. The prevalence of hemorrhoids was not significantly affected by gender. No distinctive regional distribution of hemorrhoids was demonstrated. Whites were affected significantly more frequently than blacks, and the presence of hemorrhoids was associated with increasing social class in men but not women.

Population-based data sources provide the best information for evaluating the prevalence of chronic diseases in the general population. No previous epidemiologic studies have used such data. In the design of these population-based surveys, substantial effort was devoted to obtaining a representative sample of the entire U.S. population to eliminate biases that may have been introduced in smaller or regional surveys. The surveys analyzed in the present study were selected because they provided different measures of the occurrence of hemorrhoids and constipation. The strength of the NHIS rests in its heterogeneity covering all strata of the U.S. population. The NHIS is limited by a lack of validation of self-reported disease occurrence. The strength of hospital discharge data is reliability. Data are taken directly from the patients' records, but information is obtained only from the face sheet of the discharge record, which may be incomplete. The strength of physician visit data bases such as the NDTI and MSGP lies in their ability to provide an accurate estimation of the prevalence of diseases such as hemorrhoids and constipation that do not necessarily require hospitalization. Physician visit data may be limited by incomplete physician response rates, which may skew data to the characteristics of the reporting physicians.

Because patients may mistake other anorectal conditions for hemorrhoids, statistics based on physician diagnoses, such as NDTI or MSGP, may provide more accurate measures of the true prevalence of hemorrhoids in the general population than the NHIS. This could represent one explanation for the 4-fold difference between the prevalence rates of hemorrhoids found by the NHIS and the NDTI. A likely and obvious explanation for this difference is that many more patients complained of hemorrhoids than consulted physicians for diagnosis and treatment. Interestingly, similar epidemiologic patterns were found in the NHIS and the other surveys. This similarity may give further credence to the observed epidemiologic behavior.

On the other hand, confounding factors or systematic errors, which affect various data sources alike, could mask the true pattern and lead to skewed statistics. Symptoms alone do not allow the differentiation of hemorrhoids from other anorectal conditions. Constipation is a symptom complex arising from a heterogeneous group of disorders that frequently do not come to the attention of physicians. The term *constipation* may represent different problems to different patients because habits and concepts about defecation are influenced by social and dietary customs. Because neither constipation nor hemorrhoids is considered life threatening, the degree of complaints and health care–seeking behavior may be influenced by socioeconomic factors as well as the availability of self-treatment. Perceptions of constipation or hemorrhoids as something that is noteworthy or requires medical attention may also vary among different social or ethnic groups. Therefore, caution must be exercised when interpreting epidemiologic data regarding hemorrhoids and constipation.

Hemorrhoids are commonly considered a consequence of the aging process and increase in frequency with age (7). Results from the present study do not support this contention. Rather, it appears that the occurrence of hemorrhoids actually decreased with age. A hyperbolic age distribution of hemorrhoids was observed in all surveys. At present, the reason for these distributions is unclear. It could be related to decreased anal pressures associated with aging (26–28). It may also be speculated that increased use of enemas or laxatives in the elderly for treatment of constipation could decrease the expression of hemorrhoids.

In England and Wales, higher social class was correlated with increasing prevalence rates of hemorrhoids. No such pattern was found for varying income levels in the United States. Differences in the occurrence of hemorrhoids in England and the United States may be explained by differences in social classification. In the United States, family income is determined by other factors in addition to occupation. By contrast, social class is closely associated with occupation in England and Wales. Therefore, in England and Wales the risk associated with social class may primarily represent the occupations that underlie individuals' assignment to social classes. This conten-

tion is supported by comparison of the occurrence of hemorrhoids in males with the occurrence in females categorized by their husbands' social classes. If an environmental factor directly related to income level or social status influenced the development of hemorrhoids, married women and their husbands would be expected to demonstrate parallel epidemiologic distributions, unlike the male and female patterns shown in Figure 4. The possible influence of occupation on the development of hemorrhoids has previously been suggested by Prasad et al. (12), who noted that a majority of their patients with hemorrhoids had clerical, business, or sedentary occupations involving prolonged sitting while only 34% were engaged in manual labor or "ambulatory types of occupations" (12). As outlined above, however, the influence of other confounding factors in the socioeconomic distribution of hemorrhoids cannot be ruled out.

The basis for the difference in the prevalence of hemorrhoids between urban and rural residents is unclear. Although statistically significant, this difference is small. Traditionally, urban dwellers have had higher income levels than rural dwellers. The apparent discrepancy between the urban and rural prevalences of hemorrhoids observed in the United States compared with the income level pattern observed in England and Wales may again suggest that socioeconomic factors are less important in the etiology of hemorrhoids in the United States than in England and Wales.

Constipation has long been implicated in the pathogenesis of hemorrhoids and is widely believed to be a major risk factor for hemorrhoids. In the early 1970s, Burkitt speculated that the occurrence of hemorrhoids was causally related to constipation, presumably because of a deficiency in dietary fiber (1,9,10). If constipation and hemorrhoids share a common etiologic risk factor, they should demonstrate similar epidemiologic patterns. From the results of the present study, the epidemiologic pattern of constipation appears to be divergent from that of hemorrhoids. The age distribution of constipation demonstrates an exponential increase with advancing age while a decrease in the occurrence of hemorrhoids after age 65 yr is observed. Constipation seems to be more common in blacks and in persons from families with low incomes or less formal education (29), while hemorrhoids seem to be more common in whites and in the higher social classes. Dissimilar epidemiologic behavior of hemorrhoids and constipation does not rule out a causal relationship, but the data presented here raise questions about the presumption of causality between constipation and hemorrhoids. Case-control studies may provide avenues of future investigation into the relationship between hemorrhoids and constipation.

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