

ORIGINAL ARTICLE

# Association between hemorrhoids and long-sitting among the Makkah, Saudi Arabia population

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## ABSTRACT

**Objective:** This study aimed to examine the role of prolonged sitting as a risk factor for hemorrhoids and the effect of other risk factors.

**Methods:** In the current cross-sectional study, a *de novo* questionnaire was designed and validated after revision of the literature was prepared for distribution by Google Forms. The data were collected from the general population of Makkah, Saudi Arabia. The minimum sample size was calculated to be 385 using OpenEpi version 3.0.

**Results:** Of a total of 395 participants with a mean age of  $31.8 \pm 12.59$ , most of the participants did not report having risk factors of hemorrhoids. The age of participants, as well as their occupations and the period that they held those occupations, were significantly associated with having a diagnosis of hemorrhoids. However, no statistical significance was established with the period of sitting per day or the work position.

**Conclusion:** Although there was a significant association between hemorrhoids and certain occupations, this analysis suggested prolonged sitting was not a significant risk factor. However, factors such as no access to restrooms while on the job were more responsible for developing hemorrhoids. Further studies are recommended to investigate the role of occupational settings on hemorrhoids.

**Keywords:** Association, hemorrhoids, long-sitting, Makkah, Saudi Arabia.

## Introduction

Hemorrhoidal disease (HD) is one of the most common anorectal conditions with high frequent recurrence rates among adults worldwide. In healthy individuals, there are anal cushions surrounding the anastomoses between the superior rectal artery and the superior, middle, and inferior rectal veins. HD occurs when these venous cushions become inflamed, swollen, and displaced [1,2].

Hemorrhoids can accrue below the dentate line (external hemorrhoids) or above the dentate line (internal hemorrhoids). Patients who have external hemorrhoids usually present with painful bleeding per rectum during defecation, described as bright red blood on the toilet paper. It can be associated with itching, discomfort, or prolapse. Internal hemorrhoids are often painless because

somatic nerves do not innervate them. It is classified into four degrees according to the degree of prolapse [3].

Any condition that increases intra-abdominal pressure can be considered a risk factor for hemorrhoids, such as obesity, pregnancy, and straining. There are other factors assumed to increase the risk of developing hemorrhoids,

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including age, diet, family history, prolonged sitting position, and defecation position [1,4].

Lifestyle modification treats hemorrhoids conservatively, including increasing fiber and fluid intake and physical activity. In addition, topical treatment with creams containing anesthetics, corticosteroids, and anti-inflammatory drugs can relieve symptoms. It can be removed through surgical procedures as well, but pain and bleeding are common complications of surgical treatment [2].

Not only the symptoms of HD can cause physical and psychological discomfort even after the treatment, but the frequent recurrence rates and the pain after hemorrhoidectomy can affect the quality of patients' lives. Therefore, minimizing the risk factors of developing hemorrhoids can improve patients' lives [4]. Long-sitting positions could be a risk for developing HD. However, it has not yet been established how sitting work positions and prolonged sitting affect the risk of hemorrhoids [4].

A study was published in 2017 assessing the diabetes risk in physically inactive individuals involving 28,051 adult participants, finding that 1,253 (4.5%) developed diabetes during 11 years of follow-up, sitting  $\geq 8$  hours/day was associated with a 17% (95% CI: 2, 34) higher risk of developing diabetes compared with sitting  $\leq 4$  hours/day, adjusted for age, sex, and education. Findings suggested that total sitting time has little association with diabetes risk in the population, but prolonged sitting might contribute to an increased diabetes risk among physically inactive people [5].

Another study conducted in Korea in 2018 analyzed the association between more extended sitting and low physical activity and chronic low back pain. A sectional study involving 7,380 participants reported that more than 7 hours/day sitting time was significantly associated with lower back pain (LBP). The risk of LBP increased with increasing duration of sitting time. In participants with low levels of physical activity, the duration of sitting time showed a more positive association with LBP than that in all the participants and participants with high levels of physical activity [6].

A sample of 17,013 Canadians between 18 and 90 years was evaluated, and the daily sitting time and mortality from all causes, including cardiovascular disease (CVD) and cancer, were examined. There were 1,832 deaths (759 of CVD and 547 of cancer) during 204,732 person-years of follow-up; there was a progressively higher risk of mortality across more elevated levels of sitting time from all causes but not cancer [7].

A study was conducted in 2021 to assist the association of physical activity and sitting time with overweight/obesity; a total of 23,112 participants were selected from 2010 to 2012; results showed that the risk of overweight/obesity by male employees with long work-time spent sitting was higher than those with short work-time spent sitting [8].

On the other hand, a study was published in 2021 assessing the influence of sitting work position and sitting time on the risk of hemorrhoids in female production workers; the study revealed that sitting work position and sitting time were not associated with an increased risk of hemorrhoids, in addition to that less consumption of vegetables and fruit would increase the risk of hemorrhoids [4].

Early detection and complete assessment of possible risk factors are essential for prevention and minimization of potential complications. Despite hemorrhoids being one of the most common anorectal conditions, it has not been well studied globally or locally. Thus, this study aimed to assess the association between long-sitting and hemorrhoids.

## Subjects and Methods

A cross-sectional study that used a validated survey prepared for distribution by Google Forms. The study was conducted among the general population of the western region of Saudi Arabia from October 2022 to November 2022.

Since the study targeted the general population of the Western region in Saudi Arabia, all participants over 18 years were included. Upon determining the study population, the sample size was calculated using OpenEpi version 3.0. Accordingly, the sample size required for this study was 385. However, 395 participants were involved in the research.

Inclusion criteria included adult residents of Makkah with long-sitting is population includes individuals who sit for longer than 5 hours daily, and no exclusion criteria. The sampling technique used was snowball sampling.

The survey used was designed and validated after a literature review, face validation was applied by two consultants in the field, and a pilot study was conducted to assess the survey used. Statistical analysis of the study was conducted using RStudio (R version 2023.06.1+524). Frequencies and percentages were used to express the categorical variables, while numeric data were presented as mean  $\pm$  SD according to the distribution type of the variables. Items with multiple responses were analyzed using the multiple-response analysis technique. Factors associated with hemorrhoid diagnosis were assessed using Pearson's Chi-squared or Fisher's exact test whenever applicable. A *p*-value of  $<0.05$  indicated statistical significance.

## Results

Three hundred ninety-five adults from Makkah City, Saudi Arabia, were included in this study. The analysis primarily consisted of Saudi participants (96.2%), with females accounting for the majority (60.3%). The mean age was 31.8 years, with a standard deviation of 12.587. Over half of the participants were single (57.2%), a significant proportion held a bachelor's degree (68.9%),

**Table 1:** Demographic characteristics of the participants (n = 395).

Variables		Frequency (n)	Percentage (%)
Age (mean, SD)		31.800 (12.587)	
Age	18–24 years	190	48.1
	25–34 years	64	16.2
	35–44 years	61	15.4
	45–54 years	52	13.2
	55 and over	28	7.1
Gender	Female	238	60.3
	Male	157	39.7
Nationality	Saudi	380	96.2
	Non-Saudi	15	3.8
Social status	Single	226	57.2
	Married	155	39.2
	Divorced or widow/er	14	3.5
Educational level	No formal education	3	0.8
	Elementary/intermediate school	4	1.0
	High school/diploma	81	20.5
	Bachelor's degree	272	68.9
	Post-graduate education	35	8.9
Body mass index	Underweight (under 18.5)	30	7.6
	Healthy range (18.5–24.9)	169	42.8
	Overweight (25–29.9)	100	25.3
	Obesity (30–39.9)	87	22.0
	Severe obesity (40 or over)	9	2.3

and the majority were in the healthy range of body mass index (42.8%) (Table 1).

An analysis of the participants' risk factors for hemorrhoids revealed that most participants had none of the mentioned risk factors; however, obesity emerged as the most prevalent risk factor, followed by acute current constipation (Figure 1).

The bus and car drivers sit for the most prolonged hours daily, followed by healthcare providers, field-workers, and office workers (Figure 2).

Most participants did not have constipation (79.2%). However, for those who had constipation, 12.7% reported passing stool three times or less per week, and up to 7.3% said their constipation lasted for multiple weeks or months, and 7.1% reported being constipated for over a year. Most participants preferred using a toilet with a pedestal for sitting (64.8%), in contrast to 35.2% who preferred a squat toilet. The duration of excretion for most participants was less than 10 minutes (73.9%), and the most common type of stool observed based on the Bristol Stool Chart was "type 4: Like a sausage or snake, smooth and soft" (50.1%), followed by "type 3: Like a sausage but with cracks on its surface" (28.1%). Pain with defecation was the most frequently reported

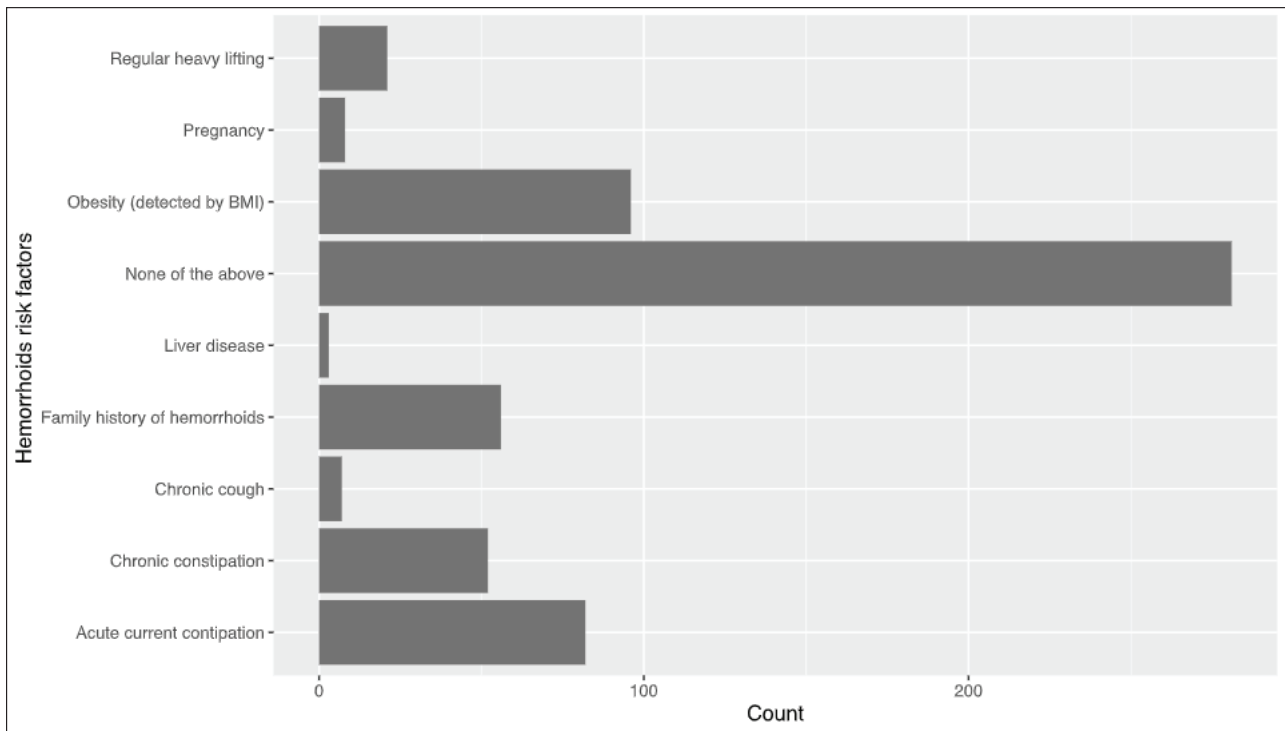
symptom (39.0%), followed by discomfort or itching (28.4%), swelling or mass (19.7%), bleeding per rectum (13.9%), discharge (8.1%), and rectal prolapse (8.1%) (Table 2).

Surprisingly, daily sitting time did not significantly affect the hemorrhoid diagnosis rate. On the other hand, years of work, current occupation, and access to a room during working hours were all significantly associated (Table 3).

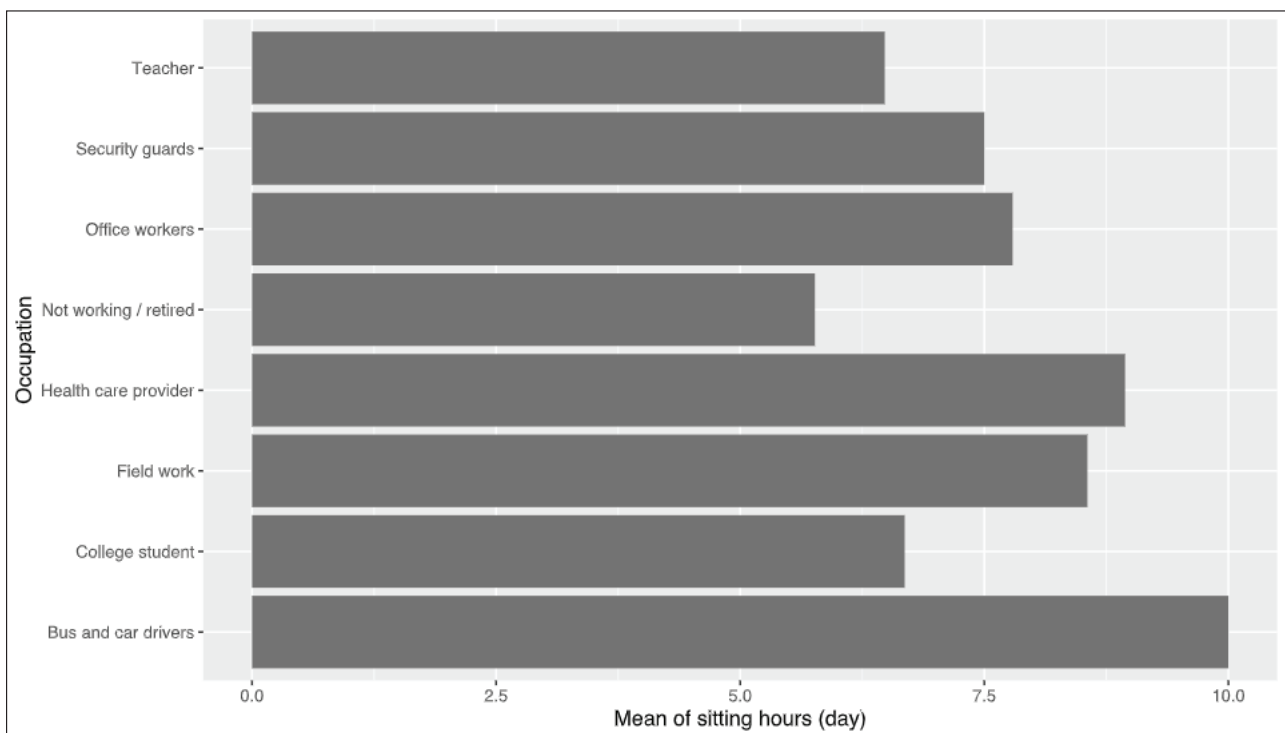
Another association consistent with the years of work is the positive association between the age of participants and having hemorrhoids (Table 4).

There were 344 individuals without hemorrhoids; most (63.4%) consumed less than 2 liters of water daily, whereas the remaining (36.6%) consumed two or more liters daily. As for their fruit intake, most consume it 1–3 times a month (41.0%), while their vegetable consumption ranges from 1–3 times a week (30.5%). Additionally, 34.9% consume a high-fiber diet 1–3 times a month. Most of these individuals had none of the co-morbidities associated with a sedentary lifestyle (83.4%), but 12.5% reported experiencing low back pain. On the other hand, among the 51 individuals diagnosed with hemorrhoids, the

## Association of hemorrhoid and long-sitting



**Figure 1.** Frequency of hemorrhoid risk factors among the included participants.



**Figure 2.** Occupation by sitting hours per day.

majority (72.5%) consumed less than 2 liters of water daily. A slight increase in the rate of consuming fruit, vegetables, and fiber was noticed among participants who were clinically diagnosed with hemorrhoids.

Moreover, 56.9% of participants did not report any complications of sitting, and 27.5% experienced low back pain, followed by diabetes (11.8%), CVD (9.8%), and cancer (2.0%) (Table 5).

**Table 2.** Participants' information regarding hemorrhoids risk factors and symptoms.

Variables		Frequency (n)	Percentage (%)
Times of passing stool <sup>‡</sup>	Three times a week or less	50	12.7
	More than three times a week	32	8.1
	Not complaining of constipation	313	79.2
Duration of the complaint <sup>‡</sup>	Not complaining of constipation	313	79.2
	Less than a week	15	3.8
	From 1 week to 2 weeks	10	2.5
	For multiple weeks or months	29	7.3
	More than 1 year	28	7.1
Prefer the position while defecation	Squat toilet	139	35.2
	Toilet with a pedestal for sitting	256	64.8
Duration of defecation (minutes)	Less than 10 minutes	292	73.9
	10–30 minutes	99	25.1
	More than 30 minutes	4	1.0
Type of stool based on the visual Bristol Stool Chart	Type 1: Separate hard lumps	13	3.3
	Type 2: Sausage-shaped, but lumpy	20	5.1
	Type 3: Like a sausage but with cracks on its surface	111	28.1
	Type 4: Like a sausage or snake, smooth and soft	198	50.1
	Type 5: Soft blobs with clear-cut edges	29	7.3
	Type 6: Fluffy pieces with ragged edges, a mushy stool	13	3.3
	Type 7: Watery, no solid pieces, entirely liquid	11	2.8
Symptoms of the anal region <sup>§</sup>	Pain with defecation	154	39.0
	Discomfort or itching	112	28.4
	Swelling or mass	78	19.7
	Bleeding per rectum	55	13.9
	Discharge	32	8.1
	Rectal prolapse	32	8.1
	None of the above	170	43.0

<sup>‡</sup>Specific questions for individuals with current constipation only.

<sup>§</sup>A multiple choice question, hence, the percentage represents the frequency of each symptom rather than the whole population.

## Discussion

Hemorrhoids are considered to be one of the most common surgical problems around the world [1]. Mild cases of hemorrhoids might be treated conservatively through lifestyle modification [2]. Thus, early diagnosis and intervention can increase the quality of the patient's life and not subject them to preventable surgical or medical treatment. Such a goal can be reached by studying the risk factors contributing to the formation of hemorrhoids to identify the patients at higher risk; hence, this study aimed to assess the relationship between hemorrhoids and long-time sitting, among other risk factors. This study also provides an outlook on the prevalence of hemorrhoids among the general population and employees of long-sitting jobs.

The current study found that the age of participants, their occupation, and the period that they held those occupations were significantly associated with having

a diagnosis of hemorrhoids. However, no statistical significance was established with the period of sitting per day or the work position. A case-control study investigating the role of prolonged sitting as a risk factor for hemorrhoids revealed that sitting for 5 hours or more was significantly associated with developing hemorrhoids compared to sitting for fewer hours per day [9]. Although further studies are recommended to investigate the subject further, the association found in the mentioned study was correlated to the nature of jobs, such as restraining workers from having healthy access to restrooms and not prolonged sitting.

Analysis of the current study data also revealed that constipation and obesity are the most common risk factors of hemorrhoids; previous studies that investigated hemorrhoids risk factors have also found similar results [10,11]. Furthermore, low consumption of vegetables and fruits was among the most significant

**Table 3.** The association between hemorrhoids and long sitting factors.

Variables		Clinical-based diagnosis of hemorrhoids				p-value
		Diagnosed (N = 51)		Undiagnosed (N = 344)		
		n	%	n	%	
Work hours (day)	Mean (SD)	7.38 (2.41)		7.14 (2.06)		0.543
	N-Miss	17		190		
Work period (years)	Mean (SD)	20.92 (10.98)		12.19 (10.56)		<0.001*
	N-Miss	24		253		
Sitting time (day)	<2 hours	6	11.8	48	14.0	0.245
	2 to 5 hours	17	33.3	146	42.4	
	≥6 hours	21	41.2	94	27.3	
Current occupation	Bus and car drivers	1	2.0	4	1.2	<0.001*
	College student	10	19.6	164	47.7	
	Field-workers	1	2.0	9	2.6	
	Health care provider	1	2.0	16	4.7	
	Not working/retired	19	37.3	70	20.3	
	Office workers	11	21.6	55	16.0	
	Security guards	4	7.8	4	1.2	
	Teacher	4	7.8	22	6.4	
Work position	Continuous sitting position	19	37.3	131	38.1	0.751
	Sitting and standing alternately	25	49.0	153	44.5	
	Not working	7	13.7	60	17.4	
Have access to the room during working hours	Yes	49	96.1	282	82.0	0.011*
	No	2	3.9	62	18.0	

\*Represent statistical significance data as a p-value of <0.05.

**Table 4.** The association between hemorrhoids and demographic factors.

Variables		Clinical-based diagnosis of hemorrhoids				p-value
		Diagnosed (N = 51)		Undiagnosed (N = 344)		
		n	%	n	%	
Gender	Male	20	39.2	137	39.8	0.934
	Female	31	60.8	207	60.2	
Age	18–24 years	10	19.6	180	52.3	<0.001*
	25–34 years	8	15.7	56	16.3	
	35–44 years	10	19.6	51	14.8	
	45–54 years	9	17.6	43	12.5	
	55 and over	14	27.5	14	4.1	
Body mass index	Underweight	1	2.0	29	8.4	0.522
	Healthy range	21	41.2	148	43.0	
	Overweight	15	29.4	85	24.7	
	Obesity	13	25.5	74	21.5	
	Severe obesity	1	2.0	8	2.3	

\*Represent statistical significance data as a p-value of <0.05.

and well-studied risk factors of hemorrhoids; the results of the current research are consistent with multiple centers in the United States and Puerto Rico that showed reduced risk of hemorrhoids with increasing

fiber consumption. In addition, fiber consumption was found to be effective in treating symptomatic hemorrhoids, according to a meta-analysis conducted in 2006 [12,13].

**Table 5.** Dietary habits and co-morbidities among the included participants.

Variables		Diagnosed with Hemorrhoids		Undiagnosed with Hemorrhoids	
		<i>n</i>	%	<i>n</i>	%
Water consumption	2 or more liters per day	14	27.5	126	36.6
	Less than 2 liters per day	37	72.5	218	63.4
Fruit consumption	Never	1	2.0	29	8.4
	1–3x/month	21	41.2	141	41.0
	1–3x/week	19	37.3	102	29.7
	4–6x/week	4	7.8	35	10.2
	1x/day	2	3.9	32	9.3
	>1x/day	4	7.8	5	1.5
Vegetable consumption (e.g., lotus, cucumber)	Never	0	0.0	16	4.7
	1–3x/month	16	31.4	88	25.6
	1–3x/week	17	33.3	105	30.5
	4–6x/week	8	15.7	67	19.5
	1x/day	6	11.8	52	15.1
	>1x/day	4	7.8	16	4.7
High-fiber consumption (e.g., beans, whole grains)	Never	7	13.7	57	16.6
	1–3x/month	20	39.2	120	34.9
	1–3x/week	18	35.3	92	26.7
	4–6x/week	3	5.9	36	10.5
	1x/day	2	3.9	27	7.8
	>1x/day	1	2.0	12	3.5
Complications of sitting	Low back pain	14	27.5	43	12.5
	Cardiovascular disease	5	9.8	4	1.2
	Diabetes	6	11.8	17	4.9
	Cancer	1	2.0	4	1.2
	None of the above	29	56.9	287	83.4

Age was also a contributing factor; this study found that people who were 55 years old and older had a higher prevalence of hemorrhoids, which is consistent with one study that reported progressive increases in hemorrhoids prevalence with age and the highest prevalence in older age [14] and among 45–65 years old to be the highest prevalence to have hemorrhoids [15].

## Conclusion

Although there was a significant association between hemorrhoids and certain occupations, this analysis suggested prolonged sitting was not a significant risk factor. However, factors such as no access to restrooms while on the job were more responsible for developing hemorrhoids. Further studies are recommended to investigate the role of occupational settings on hemorrhoids.

## Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

## Funding

None.

## Consent to participate

Informed consent was obtained from all the participants.

## Ethical approval

Ethical approval was obtained from the Biomedical Research Ethics Committee of Umm AL-Qura University via reference number HAPO-02-K-012-2022-11-1352. Dated: 25-12-2021.

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