

Research Article

Traveler's Constipation: A Prospective Cohort Study

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Abstract

Objective: Traveler's constipation, which is characterized by the occurrence of harder and less frequent stools during travel, might affect the travel experience of individuals worldwide. The aim was to investigate changes in bowel habits and gastrointestinal symptoms following a medium-haul flight and short-term stay abroad.

Methods: Data in this prospective cohort study were collected from participants before, during and after a week-long stay abroad, involving a medium-haul flight, in May 2023. The primary outcome measured changes in time between bowel movements in hours, while secondary outcomes included alterations in gastrointestinal symptoms through the Visual Analog Scale for Irritable Bowel Syndrome (VAS-IBS).

Results: Thirty participants were analyzed. For the primary outcome, participants travelling abroad experienced a median delay of 6 hours in their first bowel movement compared with their habitual frequency. In the constipated group (defined as the slowest quartile), participants waited a median of 47 hours to have their first bowel movement, whereas the rest of the group waited a median of 24 hours. Although no significant change in symptoms was observed between the two groups, some patients in both groups scored badly on the VAS-IBS with regards to gastrointestinal bloating, pain and discomfort.

Conclusion: There was a delay in the onset of habitual bowel movements across the entire cohort following travel abroad, with a notable delay in the slowest quarter of participants. Additionally, some participants reported severe gastrointestinal bloating, pain and discomfort, which may significantly impact the overall travel experience.

Keywords: Travel; Constipation; Cohort; Visual Analog Scale for Irritable Bowel Disease

Trial Registration

NCT06155929

Introduction

Traveler's constipation, characterized by the presence of harder and less frequent stools during travel, has received limited attention in the medical literature. With an estimated 700 million tourists travelling internationally in the first half of 2023, according to the United Nations World Tourism Organization a considerable number of people are at risk of having their travel affected by lavatory challenges [1]. Few studies have investigated this issue and the occurrence and magnitude of the problem remain unknown [2,3]. Travel-related constipation seems to be a temporary problem as one cross-sectional survey examining 108 participants found no difference in symptoms of constipation after 12 months abroad [3]. Another retrospective study including 70 participants found that 40% complained of constipation in relation to a transatlantic journey from Argentina to Spain [2]. The prevalence of constipation in the general population has been estimated to range from 2 to 34% [4-6]. However, everyday circumstances change during travel and various hypotheses have been proposed to explain the occurrence of travel constipation including disruptions in circadian rhythm due to jet lag, altered schedules and limited access to sanitary facilities [2].

The aim of this study was to investigate changes in participants' bowel habits and gastrointestinal discomfort following a medium-haul flight and short-term stay abroad.

Material and Methods

This was a prospective cohort study reported in accordance with the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) statement [7]. The study investigated the changes in regular bowel habits in the context of a medium-haul 3-hour flight, as well as subjective changes in gastrointestinal complaints regarding bloating, pain and discomfort. Data were collected during May 2023, encompassing a period before, during and when the participants returned home after a weeklong trip from Denmark to Turkey. The participants of the study were researchers taking part in an academic research course abroad. The inclusion criteria were the ability to read and understand Danish and hereby be able to answer the questionnaires and give written informed consent. Exclusion criteria were a history of bowel resection (more invasive than an appendectomy), diagnosed irritable bowel syndrome or inflammatory bowel disease. The primary outcome was time to first defecation after traveling. We focus especially on the travel abroad to Turkey. Secondary outcomes included characterization of constipated participants and the general deviations of gastrointestinal symptoms from the baseline data before the trip. The baseline frequency of bowel movements was calculated as the average of bowel movements within the last week, as this has been shown to correlate closely with how many bowel movements patients usually have [8].

After obtaining informed consent, participant characteristics were collected, including age, sex, habitual subjective gastrointestinal well-being, use of laxatives, regular bowel patterns and type, previous history of constipation while traveling abroad and information on the length of stay abroad. As all data were collected through questionnaires, all the reported data are subjective. Data were collected at three different time periods: 1) at baseline in Denmark before traveling, 2) after taking the outbound plane abroad and during the stay in Turkey and finally 3) after returning by plane home to Denmark. The questionnaires were administered as follows: after answering the baseline data, patients were asked daily whether they had a bowel movement since the last questionnaire. If they had not had a bowel movement, they were asked to score three different symptoms (bloating, pain and discomfort) on a Visual Analog Scale [9] concerning Irritable Bowel Symptoms (VAS-IBS) with scores ranging from 0 to 100, 0 being no symptoms and 100 being the worst imaginable degree of symptoms. However, in the Danish translated and validated version the scale was flipped so that 0 was no symptoms and 100 was the worst imaginable symptoms [10]. If participants had not experienced bowel movements since the last questionnaire, they were asked to score the stool on a Bristol Stool Form Scale [11] in a Danish validated version. The data were collected with the Research Electronic Data Capture (REDCap) web application [12] so the participants could fill out the questionnaires privately and so the data were anonymized. Quantitative outcome variables included: complaints on the VAS-IBS, time between bowel movements and assessment of the stool according to Bristol Stool Form Scale. All variables were collected at the abovementioned three time points. For the analysis, the participants were considered constipated if they were amongst the slowest quartile to have a bowel movement after arriving in Turkey. These individuals will be referred to as the constipated group. At the start of data collection, participants were instructed to meticulously observe the characteristics of their feces and note the precise time of fecal delivery to reduce potential recall bias.

Participants were included using the convenience sampling method meaning that we included all available participants who were willing to participate. Statistical analyses were performed in R (version 4.1.0 - R foundation for Statistical Computing, Vienna, Austria). For continuous data, normality was assessed using QQ plots and histograms. Continuous data were reported as median and range as data were not normally distributed. A p-value <0.05 was considered statistically significant. Categorical data were analyzed using the Chi-squared test or Fisher's exact test.

Ethical Statement

An approval from the Danish Data Protection Agency was obtained prior to the study (P-2023-339). The regional ethics committee was contacted and documented that the project was exempt from formal ethics committee approval (F-23025419). Written informed consent was obtained from all included participants. The study was registered on www.clinicaltrials.gov prior to inclusion of patients (NCT06155929).

Results

Of the 36 available participants approached, four were not eligible, Fig. 1. Thus, 32 participants were included, but as two did not respond to the questionnaires, data from 30 participants were analyzed. Participants' characteristics are presented in Table 1. A subjective history of previous travel-related constipation was reported by 39% of participants. Habitually, the participants had a median of seven weekly bowel movements, thus, a frequency between bowel movements of 24 hours (Fig. 2) and they reported few gastrointestinal complaints before traveling (VAS-IBS), Table 1.

The time to first bowel movement decreased significantly when participants traveled abroad (Turkey) compared with their habitual frequency ($p=0.04$). Across all participants, in Turkey, there was a median delay of bowel movement of six hours (range -35-74 hours) compared with the participants' habitual frequency ($p=0.03$). Especially, it took the individuals in the constipated group (slowest quartile) a median of 47 hours before delivering their first bowel movement abroad (range 39-98 hours), Fig. 3. In contrast, the non-constipated group (remaining participants) only waited 24 hours (range 0-30 hours) for their first bowel movement, which was significantly shorter than for the constipated group ($p<0.001$). Before traveling, the constipated group waited a median of 24 hours (range 24-42 hours), while the non-constipated group waited a median of 17 hours (range 8-24 hours) ($p<0.001$) as depicted in Fig. 3.

Regarding gastrointestinal complaints after traveling abroad, the constipated group did not differ significantly from the non-constipated group with regards to gastrointestinal bloating, pain or discomfort (VAS-IBS), see Table 2. However, for the entire cohort differences occurred. The upper limit of the range on the VAS-IBS score increased by approximately 60 compared with the baseline data, 21 (range 0-83), 5 (range 0-82) and 15 (range 0-74) for gastrointestinal bloating, pain and discomfort, respectively, as seen in Table 1 and 2.

After returning home, the frequency between bowel movements was a median of 26 hours (range 6-74 hours), Fig. 2 and the scores on the VAS-IBS remained in the same range as baseline (data not shown). The entire cohort's evaluation of the results of the bowel movements on the Bristol Stool Form Scale are visualized in Fig. 4. From baseline to traveling abroad to travelling home there was a tendency of a lesser hard stool.

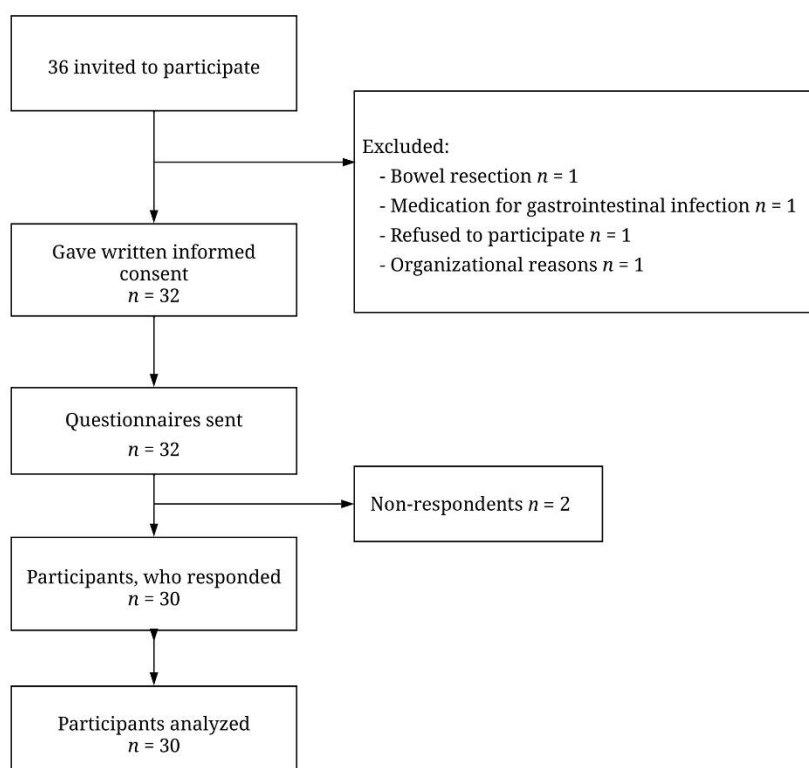


Figure 1: Flow diagram of participant inclusion and exclusion. n: number.

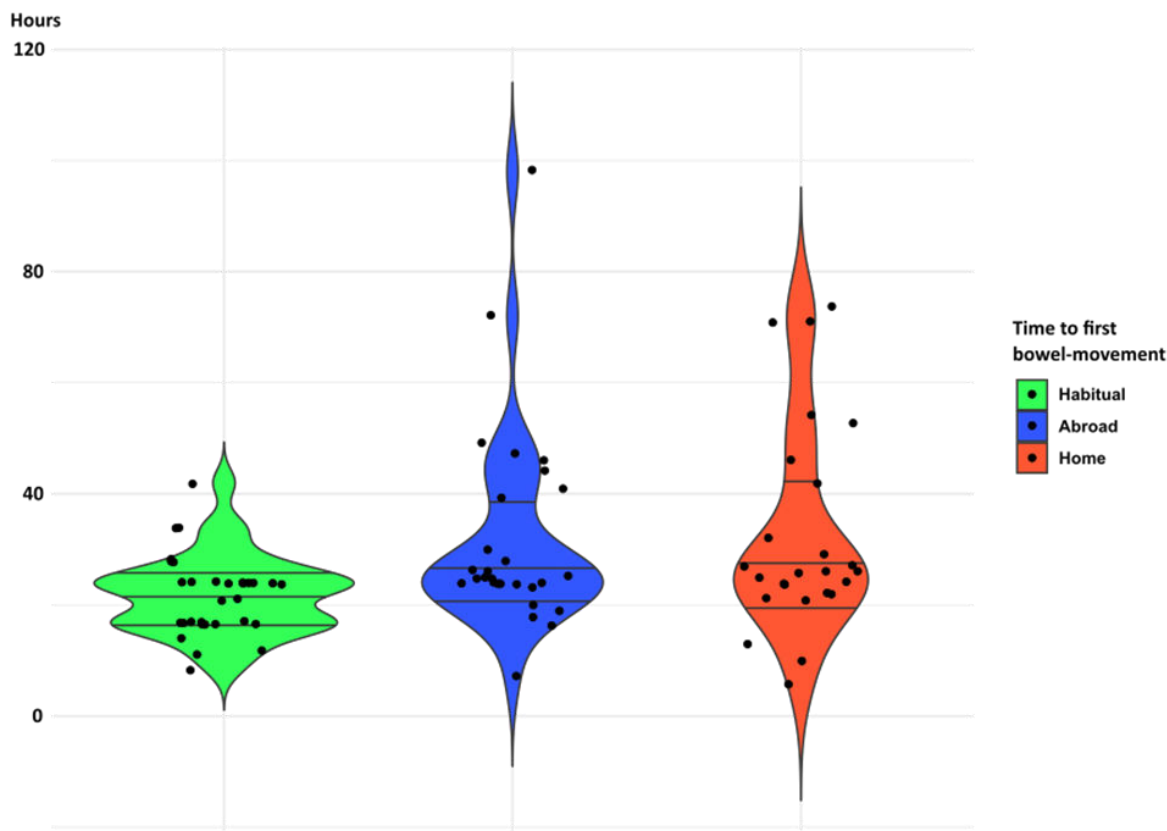


Figure 2: Violin-graph showing the time in hours until first bowel movement at baseline, meaning their habitual frequency of bowel movements (green), after traveling abroad to Turkey (blue) and after traveling home to Denmark (red).

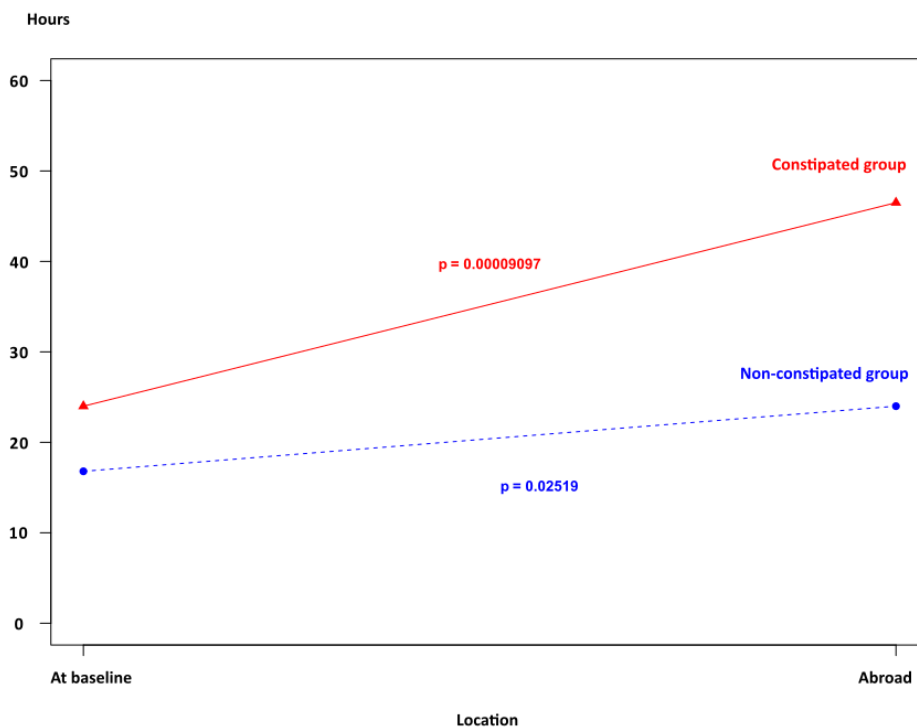


Figure 3: The median time to defecation in hours (y-axis) in the habitual home-country environment compared with after travelling abroad and arriving at the destination. The solid red line shows the constipated group and the dashed blue line the non-constipated group.

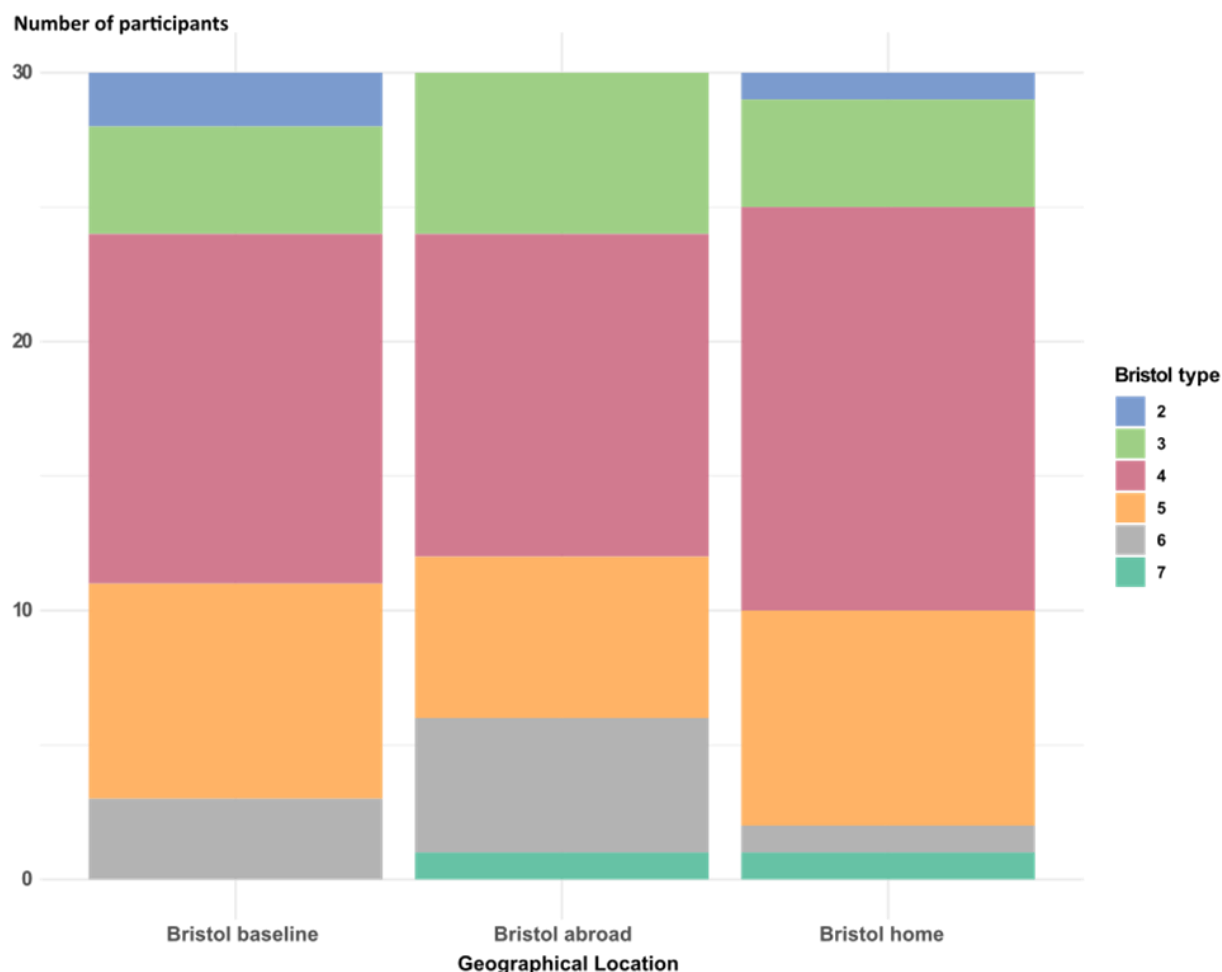


Figure 4: The count of the different types of stools on the Bristol Stool Form Scale. The scale ranges from stools of type 1 being “separate hard lumps”, type 2 “lumpy and sausage like”, type 3 “a sausage with cracks in the surface”, type 4 “like a smooth, soft sausage or snake”, type 5 “soft blobs with clear-cut edges”, type 6 “mushy consistency with ragged edges” to type 7 “liquid consistency with no solid pieces”.

	n = 30
Sex	
Male	19 (61)
Female	12 (39)
Age in years, median [range]	33 [28-40]
Recent use of laxatives	2 (6)
Recent use of anti-diarrheal medication	1 (3)
Subjective history of previous travel-related constipation	12 (39)
Habitual weekly bowel movements, median [range]	7 [4-20]
Baseline VAS-IBS (0-100), median [range]	
Gastrointestinal bloating	20 [10-28]
Gastrointestinal pain	3 [0-24]
Gastrointestinal discomfort	19 [4-27]

Table 1: Participants’ characteristics reported as number and percent if not stated otherwise. IQR: interquartile range, VAS-IBS: Visual Analog Scale for Irritable Bowel Syndrome (scale from 0-100, worsening of complaints equals a higher score). The baseline VAS-IBS is the scores of the participants before travelling abroad.

Parameters	Entire cohort n = 30	Constipated group n = 8	Non-constipated group n = 22	p-value
Time to first bowel movement, hours	25 [0-98]	47 [39-98]	24 [0-30]	<0.001
VAS-IBS				
Gastrointestinal bloating	21 [3-83]	14 [3-81]	23.5 [5-83]	ns
Gastrointestinal pain	5 [0-82]	9 [0-72]	10 [0-82]	ns
Gastrointestinal discomfort	15 [0-74]	12 [0-71]	17 [4-74]	ns

Table 2: Time to first bowel movement and Visual Analog Scale for Irritable Bowel Disease (VAS-IBS) scores after travelling abroad to Turkey. VAS-IBS is scale from 0-100, worsening of complaints equals a higher score). Numbers are reported as median and range., ns: not significant. The p-value is from the test comparing the results of the constipated group versus the non-constipated group.

Discussion

This prospective cohort study found that the time to first bowel movement was delayed by a median of six hours after air travel abroad compared with habitual bowel habits. The constipated group, defined as the slowest defecatory quartile, waited a median of almost two days before their first bowel movement. Across the entire cohort, symptoms varied greatly with some participants experiencing no gastrointestinal symptoms, while others were very much affected with respect to gastrointestinal bloating, pain and discomfort.

We have not found other studies for direct comparison; however, studies have tried to determine the defecation frequency and timing in the general population [13,14]. A prospective cohort study of 1,897 people found that the most prevalent time lapse between defecations clustered around a peak of 24 hours [14]. Another prospective study including 124 men and women found that the mean time between bowel movements was 19 hours [13]. These results are somewhat similar to ours but show a slower bowel transit time compared with our non-constipated group. The difference between the constipated and the non-constipated groups emphasizes the vulnerability of certain travelers to the onset of constipation in connection with travel. Despite this, the constipated group did not feel more bloated and did not have more pain or discomfort. However, participants were scoring higher values for each symptom measured when examining the entire cohort. This large variation in symptoms may be attributed to the diverse nature of the underlying causes for these symptoms.

This study has several strengths. It was reported according to the STROBE statement, ensuring transparent reporting. Data were collected prospectively and the response rate was high at 94 %, thus limiting the risk of a nonresponse bias. Furthermore, we used two validated and translated questionnaires. The risk of recall bias was limited due to the distribution of daily questionnaires and the participants were asked to pay close attention when using the lavatory. However, there are also some limitations. Exposure to a different and foreign environment, especially when traveling abroad, might lead to changes in eating and drinking habits, physical activity and sleep schedule, which could impact the gastrointestinal system [15-17]. However, participants in the academic research course dined at the same buffet and had access to the same beverages during the entire stay. This limited the variance that food and drinking habits could influence on their symptoms. In addition, a potential response bias could be present due to the taboo nature of the subject [18]. This could lead to some participants not answering truthfully or answering more socially desirable responses. An effort was made to anonymize responders, hereby limiting the social desirability bias, a type of response bias that could lead to inaccurate data [19]. The sparsity of the cohort should also be mentioned. We could only include 32 and analyze 30 participants since no more participants attended the research course. Also, data related to diarrhea and menstrual cycles were not collected. As diarrhea during travel has been deemed the most common travel-related illness and menstrual cycles are known to cause gastrointestinal symptoms, this could have blurred the results. However, this was not within the scope of this paper [20,21].

There are many possible reasons for the observed occurrence of traveler's constipation. Many travelers adopt a more sedentary lifestyle when traveling. This can be attributed to the nature of the travel, whether for business or vacation. Inactivity, however, is known to be a cause of constipation [22]. The onset of constipation may be influenced by travel-related stress, as stress and anxiety are known to impact bowel mobility and function [23,24]. A systematic review found that the brain-gut axis might be

influenced by the jet lag, suggesting that the gut is susceptible to jet lag as well [25]. Understanding these psychological influences can offer important insights into the mind-gut connection during travel. Since constipation can be stressful and most travelers have a limited amount of annual leave, exploring potential interventions and preventive strategies for managing severe constipation during travel may be important to increase satisfaction while abroad. This could involve discussing dietary modifications, hydration practices, exercise routines and potentially even prophylactic laxatives that travelers can adopt to minimize gastrointestinal discomfort and promote regular bowel movements while away from home.

Conclusion

In conclusion, participants experienced a delayed onset of habitual bowel movements by 6 hours, with the slowest defecatory quartile waiting nearly 2 days for their first bowel movement. Both the constipated group and those with shorter delays in bowel movements exhibited high scores on the VAS-IBS scale with symptoms such as gastrointestinal bloating, pain and discomfort. These findings suggest that disruptions in habitual bowel patterns, also known as travelers' constipation, pose a potential concern for those journeying abroad.

Conflict of Interests

The authors declare no conflict of interest regarding authorship roles or publication of article.

Consent

Not applicable because this study is based exclusively on published literature.

Disclosure

The authors report no conflicts of interest.

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Authors Contribution

All the authors have equal contribution and all the authors have read and agreed to the published version of the manuscript.

Data Availability

Not applicable

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