‘Holiday Sickness’ – reported exploratory outcome of over 500 United Kingdom holidaymakers with Travellers diarrhoea

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ABSTRACT

Aims
To ascertain any predictors of potential food poisoning pathogens and development of post-infective Irritable Bowel Syndrome (IBS) in UK travellers. An analysis was undertaken on prospectively collected data on 527 patients reporting symptoms of suspected food poisoning between June 2012 and June 2015.

Main outcome measures
Positive stool sample indicative of food poisoning pathogens and diagnosis of post-infective IBS.

Results
Data on 527 patients were examined. The large majority of patients did not provide a stool sample on return from holiday (n=430, 81.6%) as few visited a Doctor locally or in the UK. Only 18 patients (18.6%, 95% confidence interval [CI]: 11.4-27.7) who provided a stool sample were positive for microbiological food poisoning pathogens. Univariate analysis indicated a significant relationship between a positive stool sample and whether the individual sought any medical assistance at the resort (odds ratio [OR] 0.24, 95% CI 0.08-0.70) and whether they took any treatment (including self-medicated), (OR 0.21, 95% CI 0.06-0.67). Of the 527 patients only 30 (5.7%, 95% CI: 3.9-8.1) experienced post-infective IBS. Univariate regression indicated a significant relationship between experiencing Per Rectal (PR) bleeding and a diagnosis of post-infective IBS, (OR 3.64, 95% CI 1.00-10.49). Univariate regression also indicated an increase in the risk of developing post-infective IBS with increasing duration of symptoms (OR 1.04, 95% CI 1.02-1.05).

No significant relationship was found between a positive stool sample and developing post-infective IBS (p=0.307).

Conclusions
Very few patients provide a stool sample after experiencing holiday sickness abroad. Of those that do, only a small proportion have a positive stool sample indicative of a food poisoning microorganism. Around 6% of individuals were diagnosed with post-infective IBS. Those individuals with PR bleeding and symptoms persisting for longer durations were significantly more at risk of developing post-infective IBS, whilst medical aid and treatment abroad was found to reduce the odds of a positive stool sample

BACKGROUND AND AIMS

A large proportion of the United Kingdom (UK) population travel abroad for their holidays; with research from the office of national statistics showing that 58% of UK residents planned to travel abroad in 2014,[1]. The top three destinations were Spain, United States and France with one quarter visiting Spain,[1]. UK residents may experience differing standards of cleanliness and hygiene abroad compared to their own country, especially whilst visiting more developing nations,[2]. UK residents are therefore potentially more susceptible to contract gastrointestinal infections as a result.

There are many reports in the literature regarding the risk of developing 'holiday sickness' or what is more commonly known as 'traveller's diarrhoea' but only a few have specifically examined the prevalence in a UK based population that travels abroad with none reporting the incidence of post infective IBS,[3,4]. A pre-study literature review demonstrated that many studies have examined and reported unusual bacterial breakouts in countries visited, as well as the risk of on-going symptoms,[3,5]. However, it is impossible to know the susceptibility of the UK based population to the occurrence of post infective irritable bowel in comparison with statistics already known for other populations.

This report therefore provides a detailed description of over 500 UK holidaymakers who, whilst abroad, developed one or more symptoms attributable to the contraction of an infection, such as; abdominal cramps, sickness, vomiting, diarrhoea; with or without per rectal (PR) bleeding and/ or fever.

METHODS

Data collection

Data from over 500 cases of suspected food poisoning were prospectively collected on a dedicated secure dataset (according to NHS trust guidelines) from June 2012 until June 2015 (36 month period). For the purposes of the study, food poisoning was described as the onset of any symptoms likely to be attributable to consuming contaminated food. The data was recorded from individuals who self referred to Lawyers seeking to exercise a possible 'claim' against travel companies for signs and symptoms of suspected food poisoning contracted whilst abroad, as a result of observed poor hygiene standards on a resort. The potential 'claimants' were asked in a telephone consultation to provide information to confirm their identity, which was crosschecked against the General Practitioner (GP) records. All suspected cases with any pre-existing gastrointestinal conditions were excluded from the final analysis. In addition, any individuals who had undergone investigations in the last three years for suspected altered bowel habit, diarrhoea or abdominal cramps were also excluded with the relevant information extracted from the General Practitioner (GP) records.

Demographic data including holiday destination, time spent abroad, onset of any symptoms, advice, treatment and duration of symptoms were recorded at the time of the telephone conversation from individuals describing symptoms of diarrhoea, vomiting, abdominal cramps and/or sickness during or on return from their holiday abroad. This information was collected at CMFT onto a secure database with CMFT guidelines used for anonymisation. The data was again crosschecked with the information documented in the GP records especially with respect to the illness suffered whilst abroad, including any stool culture results. There was no target age group and pre-health checks were noted in some of the GP records in a few individuals but due to the infrequency and inconsistency in these data, this was not recorded for this exploratory manuscript. Information was also collected on any PR bleeding and on any on-going symptoms experienced on return to the UK from the GP records. An effort was also made to chase stool culture results and other tests carried out in the UK. The individuals interviewed were asked specific questions pertaining to the standard of hygiene observed in the hotel resort specifically in relation to the serving of hot and cold food, consumption of bottled and tap water, state of the dining and food preparation areas, use of sewage water to water the lawns and resources on site at the resort such as a Doctor. Potential claimants were also asked if they sought medical advice whilst abroad and if they any took or were prescribed any medication.
A record was also made of any possible post-infective irritable bowel syndrome (IBS) and gut sensitisation to certain foods on return, this complaint was also crosschecked with the GP records.

For the purposes of this study, post-infective IBS was defined to be; on-going symptoms meeting diagnostic criteria for IBS (as per Rome III criteria),[6], including abdominal cramps, occasional diarrhoea, and sensitisation to certain food products at least three months after returning from their holiday.

Statistical analysis

Each individual variable was explored descriptively with appropriate statistics (frequencies, percentage [%], mean/median and standard deviation [SD]/inter-quartile range [IQR]). Those variables with a large number of categories were reduced into fewer groups and some categories were also considered for continuous variables where appropriate. Choices were based upon clinical decision whilst aiming to create similar sized groups where possible. For the two outcomes of interest, binomial confidence intervals [CI] were calculated for the proportions.

Due to the small number of events, univariate logistic regression analyses with odds ratios [OR] were performed to examine for any potential predictors of two outcomes of interest: a positive stool culture and the development of post-infective IBS.

All analyses were performed in R version 3.1.1,[7] with library Hmisc,[8].

Ethics committee approval

The study was registered by the research and development department at Central Manchester NHS Foundation trust (R&D no: R04186). The study was discussed with the research and development team, who advised that as this was an exploratory analysis of persons' data for a potential legal claim, no ethics committee submission was required.

RESULTS

Demographics and descriptives

A total of 527 individuals were examined, after exclusions as described above, over a 36-month period. The proportion of females was slightly higher, 310 (58.8%), with an overall median age of 33 years (IQR 27-45 years).

One hundred and eleven subjects (21%) experienced symptoms of diarrhoea for 7 days or under with fewer describing symptoms for 1-2 months (n=37, 7%) and over 2 months (n=33, 6%). Commonest duration of symptoms was 8-14 days (n=180, 34%). The onset of symptoms from the time of arrival on holiday carried too many variances as well as most claimants being unable to truly recall the exact timings of the onset of illness, so this was not recorded.

All 527 claimants reported a subjectively lower level of, or poor, hygiene standards experienced during their time in the resort hotels with all reporting unclean tables and a lack of cleanliness in the dining areas as being commonplace. 100% of individuals interviewed also described the odour of sewer water on the resort. Notably 413 (78%) claimants interviewed also described never seeing a pool attendant, no smell of chlorine in the pool as well as one individual describing finding human excrement in the hotel pool on one occasion.

In depth analysis of the countries visited showed that a total of 21 different countries were visited, of which the most common five destinations were Egypt (n=289, 54.8%), Tunisia (56, 10.6%), Turkey (55, 10.4%), Spain (41, 7.8%) and The Dominican Republic (24, 4.6%). Other destinations included Bulgaria, Cuba, Mexico and Greece. Due to the small numbers visiting many of the countries (14 countries were reported by fewer than five individuals), they were categorised based upon continent for further analysis. Two-thirds of patients visited Africa (349, 66.2%) with Europe being the next most popular destination (125, 23.7%) followed by 51 visiting South America (9.7%). Only two patients visited Asia.

Most individuals stayed abroad for 7 to 14 days, therefore the number of days spent on holiday was categorised as one week or less (175, 33.2%), 8-14 days (333, 63.2%) and over a fortnight (19, 3.6%).

The median and IQR for the duration of symptoms experienced by individuals visiting the most common destinations (more than 10 individuals) are depicted (Table 1). Overall the distribution was highly skewed, with just over half (55.2%) having symptoms for a fortnight or less, while eight individuals (1.5%) suffered in excess of three months. 13 individuals (2.5%) had ongoing symptoms at the time of the report. Based on the country visited, median duration appears similar, at 14 days in most cases, except Mexico, Cuba and Greece.

The relevant symptoms experienced and recorded are demonstrated in Table 1. Interestingly all individuals experiencing suspected food poisoning described

diarrhoea as the commonest symptom, followed by stomach cramps with very few describing PR bleeding.

Of the total individuals studied, approximately half (48.0%), sought medical advice from the local pharmacist/ medic, whilst 100 (19.0%) received advice from a Doctor, mainly the hotel or resort in-house medical specialist with 206 seeking no advice and self reporting their symptoms (39%). 22 individuals reported (4.2%) self-medication. Only 24 (4.6%) individuals were admitted to a hospital locally or on return from their holiday. Individuals received a wide variety of treatments, in many cases with few details specified. Over three-quarters of individuals (410, 77.8%) took some form of treatment, either professionally prescribed or self-medicated, of which 90 (17.1%) received antibiotics and 236 (44.8%) anti-diarrhoeal medication with only 35 (6.6%) requiring rehydration with intravenous fluids.

Positive stool sample

Only 97 (18.4%) individuals were reported to have had a stool sample taken. The stool samples were taken by the GP and sent for routine microscopy and culture. As far as the authors are aware by examining the GP records, no stool cultures were sent for any other specific analysis. Of these 66 (68.0%) were negative on culture, while 13 (13.4%) had no known result recorded in the records. Importantly, 430 (81.6%) of holidaymakers did not have a stool sample taken. Eighteen 18 (18.6%, 95% CI 11.4-27.7) samples were positive indicative of a food poisoning pathogen. The organisms identified included Campylobacter (5), Cryptosporidium (2), *Cyclospora cayetenensis* (1), Salmonella (6) and Shigella (1).

Holidaymakers with a positive stool sample had a higher median age (43 years) compared to those with a negative sample, (37 years), however the two interquartile ranges overlap (31.25-46.75 years and 29.00-46.00 respectively). There is a suggestion that there may be more females with a positive stool sample, (22.6% vs 11.4%), however, conversely; more males have an unknown result (11.3% vs 17.1%). Examination with univariate regression analysis gave a non-significant result (p=0.222).

Upon looking at the continent visited and the effect this may have had on the acquisition of a positive stool sample, those visiting Europe have the largest proportion of samples which are positive, (Table 2). After dropping Asia and taking Africa as the baseline, the univariate regression analysis gave non-significant results (Americas: p=0.883, Europe: p=0.101), however this outcome could potentially be affected by our selected grouping structure. To investigate this further we examined those countries with more than five individuals visiting who had a stool sample (Egypt, Mexico, Tunisia and Turkey). Overall the univariate regression was borderline significant (p=0.046), with a significant difference upon comparing Egypt to Tunisia (OR 8.20, 95% CI 1.54-46.71 [p=0.013]) and a borderline result for Turkey (OR 6.15, 95% CI 0.99-27.37 [p=0.043]). Care should be taken in the interpretation due to the small numbers, reflected by the wide confidence intervals, but this does suggest an area for future investigation.

Very few (4, 4.1%) individuals with a stool sample took a holiday of over a fortnight in length. Of those with a positive stool sample, around three-quarters (72.2%) took a holiday of over a week, however the continuous variable displayed little difference in the summary statistics and the univariate regression result was insignificant (p=0.590) (Table 3).

All individuals with stomach cramps had a stool sample taken. A higher proportion of individuals with a positive stool sample reported vomiting (21.0% vs 14.3%), faecal soiling (23.5% vs 17.5%) and PR bleeding (40.0% vs 16.1%); but none of these were significant in univariate regression (p=0.430; p=0.587; p=0.089 respectively).

Over half of individuals with a positive stool sample had not sought any medical assistance at the resort; compared to around a quarter with a negative sample (61.1% vs 27.3%). Of all individuals who sought medical assistance only 11.5% had a positive sample, compared to 30.6% of those who had no medical assistance. This important finding is supported by significant p-value (0.010) from the univariate regression, where those who seek medical assistance at the resort have 0.24 times lower odds (95% CI 0.08-0.70) of having a positive stool sample. Help was sought from doctors and pharmacies and in some cases both.

A large proportion of individuals who did not receive any treatment (prescribed or self-medicated) at the resort were found to have a positive stool sample (40.0%) compared with 12.2% who had some treatment. With univariate regression a significant result was found (p=0.008), indicating that those who receive treatment have a decreased odds; 0.21 times lower (95% CI 0.06-0.67), of having a positive stool sample. Examining the individual results for different types of treatments with univariate regression revealed two non-significant results (antibiotics p=0.215 and anti-diarrhoeals p=0.337), however the numbers with positive samples were small.

No significant relationship was found between a positive stool sample and post-infective IBS (p=0.307). However we note that only 16 individuals with post-infective IBS have a stool sample.

Post-infective IBS

Using the definition as described above, post-infective IBS was recorded in thirty individuals (5.7%, 95% CI 3.9-8.1). Of these, five (16.7%) individuals received treatment in a hospital as a result of their on-going symptoms, with 15 (50%) describing mainly on-going diarrhoea like symptoms, and four (13.3%) experiencing onset of haemorrhoids as a consequence. Four individuals (13.3%) reported being unable to consume spicy or fatty foods as a result of their post-infective IBS, due to the recurrence of loose motions and abdominal cramps if such food is consumed. Information regarding any on-going symptoms was not available or missing, for four individuals, therefore a decision on post-infective

IBS diagnosis was not possible. These individuals were excluded from further analysis on this outcome.

There were no significant relationships between either age (p=0.396) or gender (p=0.611) and post-infective IBS. Both groups demonstrated a median age of 33 years (post-infective IQR 26.25-43.00 years, vs 27.00-45.00), while similar proportions of males and females experienced post-infective IBS (6.2% of females, 5.1% of males). A higher proportion of travellers visiting the Americas (11.8%) experienced post-infective IBS, but statistically; this was non-significant (p=0.054). Likewise an examination of the more highly visited countries (Egypt, Cuba, Dominican Republic, Mexico, Spain, Tunisia and Turkey) produced mainly non-significant results. The exception was Egypt against Cuba (OR 5.01, 95% CI 1.04-18.89 [p=0.024]), however the groups are very unbalanced, with a wide confidence interval, so this should be interpreted with care. The median duration of holiday was similar in both groups at 11 days (IQR 7.25-14.00 vs 7.00-14.00).

All individuals with post-infective IBS reported abdominal cramps, particularly when they first became unwell, followed by vomiting (24, 80.0%). Only four individuals (6.6%) with faecal soiling had post-infective IBS, but this proportion was similar to those without faecal soiling (5.6%). Proportionally slightly more individuals with post-infective IBS received treatment (prescribed or self-medicated) (83.3% v 77.3%) but this was non-significant on regression analysis (p=0.276).

Proportionally more individuals who experienced PR bleeding were diagnosed with post-infective IBS (16.7% vs 5.2%); this was significant with univariate regression (p=0.027), suggesting that those with PR bleeding are at an increased odds, 3.64 times (95% CI 1.00-10.49), of experiencing post-infective IBS.

Median symptom duration was evaluated comparing those individuals who developed post-infective IBS (42 days, IQR 23.5-78.0) against those without (14 days, 9.0-21.0), (Figure 1). Initial regression analysis suggests a strongly significant relationship (p<0.001), with the odds of post-infective IBS increasing by 1.04 (95% CI 1.02-1.05) for each additional day with symptoms. Further investigation with symptom's duration categorised showed small numbers (Table 4) with increasing odds of post-infective IBS with longer duration of symptoms. Regression demonstrated that if symptoms last for greater than one month, the odds are significantly increased to 14.0 (95% CI 4.96-41.02, p<0.001).

DISCUSSION

The literature search found no studies of 'travellers diarrhoea' or 'holiday sickness' in a UK based population reporting the incidence of post-infective IBS to date. Reports from the UK have commented on the crude incidence of travellers from the UK reporting symptoms of diarrhoea (25.7%)[9] (44.2%)[10], with another depicting a higher incidence of suffering from illness on land based holidays over cruises due to an evolving more hygienic standard being employed on cruises (7.2% v 4.8% RR = 1.5, p=0.0005) [4].

Other reported cases of foreign travel and contracting gastrointestinal illnesses have included studies on military personnel visiting war zones and contracting, mainly, parasitic infections [11,12]. One study, however, examined a UK population returning from India, reporting a new strain of Cryptosporidium in 10 returning travellers [5]. Our study, therefore, is the first reported incidence of post-infective IBS of UK holidaymakers to date.

It is recognised that the so-called 'traveller's diarrhoea' susceptibility can be greatly increased when visiting countries from a wider geographical area, especially more developing countries [10,13]. In this study all the complainants seeking a claim subjectively described the low level of hygiene noted in the resorts where they were staying, especially with observations of unclean tables, the use of sewage water to water the lawns, which all, of course, increase the risk of passing on infections by contaminated hands or even food [14]. It is well recognised that organisms leading to sickness and diarrhoea can be passed on from food which can be contaminated at any stage of its production, preparation or cooking. Food can be contaminated by incorrect cooking, particularly with meat, incorrect storage, especially food that needs to be chilled at a temperature below 5^{o}C, and by keeping cooked food unrefrigerated for a long period. Any food touched by an individual who has been ill or has been in contact with someone with diarrhoea and vomiting can cross-contaminate (where harmful microorganisms are spread between food, surfaces and equipment),[15]. Cross-contamination can also occur, for example, by preparing raw chicken or meat on a chopping board and then using the same board without washing to prepare food that won't be cooked (such as salad), as the harmful bacteria can be spread from the chopping board to the salad,[16]. A further potential mode of the transmission of food poisoning microorganisms is from food that has been washed in 'unclean' water. Almost all the claimants interviewed noted bad hygiene standards, as well as a persistent odour of sewerage in close proximity to the hotel restaurants. However, the level of hygiene does remain a subjective finding and without cultures from areas where food is prepared on the resorts it is difficult to quantify.

The commonest organism that is known to cause travellers' diarrhoea are *Escherichia coli* (*E. coli*) with Shigella, Campylobacter and Salmonella organisms as less frequent causes of acute diarrhoea, and intestinal protozoa being typical causes of protracted diarrhoea,[13,16]. In this study examining 527 persons, interestingly there were no reported cases of *E. coli*, but the number of

individuals who provided a stool sample was not high (18.4%) of which only 18 (18.6%) were reported to be positive. A negative stool culture of course does not suggest that an infective agent was not responsible for the symptoms experienced as the body's own immune system will provide an excellent first line of defence, with a failure to identify a cause reported in 40-70% of cases,[17]. Most individuals did not seek medical advice as they recognised that it was more than likely that they had acquired a gastrointestinal infection whilst abroad and so managed themselves with rest and fluid replenishment only.

The common organisms described above which are responsible for acute diarrhoea and sickness have an incubation period ranging from a few hours to several days, with a peak seen in incidence in the first week on holiday,[18]. So, many holidaymakers can actually develop symptoms within a week or so after returning from their travels.

The most commonly reported destination was Egypt where other recorded outbreaks have included hepatitis A [19]. Most published reports of traveller's-diarrhoea-like other holiday illnesses appear to arise more frequently from travel to less developed countries as stated already [19,20] with North Africa having a particularly high incidence [2]. It is therefore no surprise that certain recommendations have been made for any person prior to traveling to such countries, especially if a low level of hygiene is suspected, such as a premedical consultation with possible typhoid vaccination and anti-diarrhoeal medication [15,20]. In most infective diarrhoea cases, though, the need for anti-microbial treatment is not necessary [20] however there is some evidence that introduction of antibiotics at the onset of symptoms may reduce the length of illness [21]. It remains to be determined whether if more stool samples were collected, especially from all individuals that suffered symptoms, what percentage would have a positive sample and at what time the sample should ideally be taken [17].

Post-infective IBS was experienced in only a few patients (5.7%), which is consistent with another study which shows an incidence of between 3 and 30% from a report of six studies [22,23]. In most sufferers, although any acute infectious symptoms of vomiting and fever resolve after several days with resolution of the infection [24], some experience on-going, abdominal discomfort, bloating, and diarrhoea can persist [23]. Several factors, such as duration and severity of initial illness, may increase the risk of developing post-infective IBS [24,25]. In this study we see an increase in the likelihood of developing post-infective IBS if symptoms have persisted for greater than one month (Table 6 & Figure 1), but most patients either experienced symptoms for under 7 days or 8-14 days (21 and 34% respectively). Additionally experiencing PR bleeding was found to significantly increase the risk of developing post infective IBS (OR 3.64, 95% CI 1.00-10.49), which is a similar finding to that of Dupont et al,[26].

Many theories have been postulated for post-infective IBS to arise such as, ongoing intestinal inflammation, motility alterations, and increased intestinal permeability, which appear to be, associated with mucosal presence of serotonin-containing enterochromaffin cells, intestinal T-lymphocytes, mast cells,

and pro-inflammatory cytokines [22,24,25]. The pooled analysis of six studies suggested that individuals who complained of traveller's diarrhoea were three times as likely to develop post-infective IBS but the pooled incidence (5.4%) was similar to the findings in this study of 5.7%,[22]. The reason for the low incidence of post infective IBS, was possibly due to the low overall age group of the population and the higher concentration of individuals visiting North Africa in particular. In addition the relatively heterogeneous treatment on the resort, premedical advice and with 48% taking some form of medical treatment, combined with the smaller numbers may have played a role in the low relative risk. The general trend and incidence however was similar to other larger reports. This study did not show any increased risk of developing post-infective IBS with differences in gender or age, as with other studies [27-29]. No change in risk was also determined with symptoms of diarrhoea and abdominal cramps. However an important finding, consistent other studies [22], was an increased risk of developing post-infective IBS with PR bleeding. It was also concluded that even though the symptoms experienced strongly suggest contraction of an infectious agent, whilst abroad most sufferers' symptoms do resolve. This study included a significant cohort of UK travellers and concludes that the large majority do not have their stools tested for micro-organisms once they experience diarrhoea whilst abroad or on return from their holiday.

Almost 6% of travellers did, although, develop longstanding symptoms for IBS with on-going abdominal cramps, diarrhoea and were labelled as suffering from post-infective IBS. These patients are more significantly likely to have had symptoms for greater than one month from when they were first affected.

Limitations of this study arose especially from the small number of individuals with stool samples and subsequently positive results. The aforementioned issue regarding timing and availability of samples is an area for consideration. At present stool samples are only available for those patients whose condition warrants a UK GP consultation, however this is unlikely to create significant bias in our study as the comparison is within this subgroup.

Whilst the overall sample is substantial, many subgroups have very small numbers. This is reflected in the wide confidence intervals seen for many of the odds ratios, which does add a level of uncertainty in the interpretation. As the majority of individuals visited Egypt, with 14 countries being reported in the dataset on fewer than three occasions, some categorisation was required to investigate for a country effect. There is no ideal structure and our selected one may have lost some differences between different sets of countries. Additionally the small numbers with positive stool results and post-infective IBS prevented a thorough statistical examination considering the effects of a combination of factors via multivariate analysis. This paper is designed as an important exploratory analysis which will inform a further larger study. As such we have examined all variables and have considered all results. Considering the structure of those variables, which are insignificant gives us information regarding borderline cases and also where there may be confounding factors. These issues can be addressed in our further work, which aims to determine whether the above trends are similar with a greater cohort of patients, alongside considering

any effect on the economy with the time off work required by some as a result of their holiday sickness.

Finally the information collected is based mainly upon self-report, and whilst care was taken to cross-check against GP records, as many did not consult their GP upon return this information is subject to recall and personal opinion. This predominately affects interpretation of symptoms and their duration, and categorisation will have reduced the effect. The individuals within this study are also self-selected based upon their desire to claim compensation and as such may be negatively biased towards their symptoms and the duration compared with the general population. It is likely however, that they are representative of our population of interest and their desire to claim may provide a more accurate recall. Hence in our comparisons we feel that although the potential bias is worthwhile noting, it is unlikely to have changed our conclusions.

CONCLUSION

Very few patients provide a stool sample after experiencing holiday sickness abroad. Those that do are more likely to have a positive stool sample if they had not sought medical assistance or received treatment whilst abroad.

Although the overall risk of developing post-infective IBS was low (5.7%), the likelihood of contracting post-infective IBS was found to significantly increase if symptoms persisted for over one month from the time of onset. Those who had reported experiencing PR bleeding as an initial symptom were also more likely to develop post-infective IBS.

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