



## **Prevalence of Faecal Occult Blood in Primary School Children in Aba South Local Government Area of Abia State, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author ORE designed the study, wrote the protocol and the first draft of the manuscript. Authors ICE and IN managed the analyses of the study and performed the statistical analysis while author GCE managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Faecal occult blood is a laboratory test which looks for the presence of microscopic blood in faeces possibly as a result of gastrointestinal bleeding which may be an indication of a disease. Several large prospective randomized controlled studies have shown that faecal occult blood test (FOBT) plays an important role as a secondary preventive measure against certain diseases like gastric or duodenal ulcer, ulcerative colitis, parasitic and bacterial infections etc. Occult bleeding itself is not a disease but might be a symptom of various disease conditions. It can be performed on mailed specimens without a health center visit. A study on the prevalence of faecal occult blood among primary school children aged 7-15 years was investigated in Aba South Local Government Area (LGA) of Abia State, Nigeria between July and December, 2016. Faecal samples were collected from three (3) major primary schools in the Local Government Area and analyzed for faecal occult blood using iFOBT (One Step FOB Rapid Screen Test by CIC Pharm., UK). This test has advantages of greater clinical and analytical sensitivity, collection of a single sample, simple and

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hygienic sampling devices, higher specificity for lower gastrointestinal tract bleeding, no dietary restriction and results in improved clinical performance and higher participation rates in screenings. Out of 400 samples collected, consisting of 232 (58.0%) males and 168 (42.0%) females, 58 (14.5%) were positive for faecal occult blood, which is an indication of either gastric, ulcerative colitis, parasitic or bacterial infections. The males (16.8%) were affected more than the female (11.3%) while ages 7-9 years were most affected. The study also showed that children whose parents are traders had the highest prevalence of 27.5% compared to the children whose parents are civil servants (13.3%). Based on schools, Etche Road Primary School had the highest prevalence (19.5%) while the least was Constitution Primary School (11.2%). Statistical analysis had shown that age group, occupation of parents and the location of school have significant effect on prevalence of faecal occult blood. Early screening of occult blood is recommended in order to detect any possible trace of hidden blood in the stool samples of school children which could be as a result of parasitic or bacterial infection.

*Keywords: Faecal occult blood; stool samples; primary school children.*

## 1. INTRODUCTION

Occult gastrointestinal bleeding refers to bleeding that is not visibly apparent. It is the most common form of gastrointestinal bleeding, and can be caused by various lesions in the gastrointestinal tract. There are several disorders which may cause bleeding into the gut such as gastric or duodenal ulcers, ulcerative colitis, bacterial (*Helicobacter pylori*) and parasitic infections [1,2,3]. For example, the prevalence of *H. pylori* infection is still high in developing world with as much as 90% [4,5] and almost all of these acquired the infection before the age of 10 years [4]. Ezeigbo and Ezeigbo [3] have also observed *H. pylori* and peptic ulcer infections to be endemic in Aba South LGA of Abia State. Strenuous exercise has also been found to cause acute incapacitating gastrointestinal symptoms including heartburn, nausea, vomiting, abdominal pain, diarrhea and gastrointestinal bleeding [6].

A faecal occult blood test (FOBT) is a laboratory test used to check stool samples for hidden (occult) blood caused by these infections. The faecal occult blood test can only detect the presence or absence of blood but does not indicate potential source of bleeding [7]. Significant amounts of blood can be hidden in faeces, such that patients losing up to 100 mL of blood per day may have normal-appearing faeces [8]. The test is not usually given to people who already see blood in their stool or have symptoms such as anaemia, persistent change in bowel habits, unexplained weight lost or bleeding from the rectum [9]. The likelihood that FOBTs will detect gastrointestinal bleeding depends on many factors, such as the

anatomical level of bleeding, faecal transit time, faecal mixing and degradation [10].

The test method traditionally used for detecting occult blood in faeces is the guaiac-based FOB test (gFOBT) [11]. The test has been available for decades and is widely evaluated. gFOBTs are affordable and suitable for screening programmes. To confirm a bleeding gut, usually two or three guaiac-FOB tests are done on two or three separate samples of faeces obtained on different days. However, its drawbacks include specificity of the bleeding, dietary restrictions, test interpretation and performance. Faecal immunochemical test (FIT) screening is more effective in terms of health outcomes and cost compared with guaiac-FOBT. FITs are rapidly replacing gFOBTs because of their many advantages, such as greater clinical and analytical sensitivity [12,13], collection of a single sample [14], simple and hygienic sampling devices [15], higher specificity for lower gastrointestinal tract bleeding [7,16] and no dietary restrictions [17]. The use of immunochemical faecal occult test (iFOBT) results in improved clinical performance and higher participation rates in screenings [11,18]. This study aimed at early detection of faecal occult blood using iFOBT among primary school children in Aba South Local Government Area of Abia State, Nigeria, will assist in early treated of the diseases associated with FOB.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was carried out in Aba South Local Government Area (LGA) of Abia State, Nigeria.

The geographical co-ordinates for Aba South LGA are 5°06'N latitude and 7°21'E longitude. It has an area of 49 km<sup>2</sup> and a population of 423,852 at the 2006 census ([http://en.wikipedia.org/wiki/Aba\\_South](http://en.wikipedia.org/wiki/Aba_South)). The people are very dynamic and are predominantly farmers, artisans and civil servants.

## 2.2 Ethical Review

Ethical review and research protocol were obtained from the Ethical Review Committee of the Department of Biology/Microbiology, Abia State Polytechnic, Aba. Permission was sought from School Management Board and the management of each of the schools and the parents of the pupils. All subjects who gave their consent and are willing to participate in this study signed the consent form and presented their identification data (name, age, sex, occupation etc).

## 2.3 Study Design

Stool samples were collected from school pupils between ages 7-15 years. Three largely populated government primary schools were sampled (Constitution Primary School, Clifford Road Primary School and Etche Road Primary School). Sampling was based on population and location of the schools. While Clifford and Etche Road Primary schools are located in areas mostly occupied by traders and artisans, Constitution Primary school on the other hand is located in a government reserved area occupied by public and civil servants. Two days prior to collection of sample, the pupils and their parents were properly informed on the purpose of the research and proper sample collection. Pupils who were menstruating or have visible blood in their urine or stool during the period were excluded. A weakness to this study is that anaemia and intestinal parasites were not investigated since the focus was on prevalence of faecal occult blood.

## 2.4 Sample Collection

Stool samples were collected with the use of catching device (hat-shaped plastic lid). The catching device prevents contamination of the stool samples by water, urine or dirt. The stool samples were put in sterile screw-capped bottles and labeled with identification numbers (code numbers, age, sex, and occupation of parents). The collected samples were taken to the

Microbiology Laboratory of Abia State Polytechnic, Aba for analysis.

## 2.5 Faecal Occult Blood Test (FOBT)

Faecal occult blood test was performed according to manufacturer's procedures using iFOBT (One Step FOB Rapid Screen Test by CIC Pharm., UK). A packet of the "One Step FOB Rapid Test Kit" contains 25 strips of less than US\$20. This test requires single sample, has greater clinical and analytical sensitivity with no dietary restrictions. 2 g of each stool sample was thoroughly emulsified in 5 mL of normal saline in a test tube (faecal occult blood test tube), using sterile rod, and each placed in a test tube rack. The emulsified stool samples were allowed to sediment, after which, a faecal occult test strip was dropped into the mixture and allowed to absorb it. Two red lines at the middle of the strip indicate a positive result, while negative result is an indication of one red line.

## 2.6 Statistical Analysis

Statistical analysis was done using statistical package for social sciences (SPSS) version 20.0. Statistical significance tests included the use of *p-value* to assess the role of chance. In this study, *p-value* < 0.05 was used to disapprove the null hypothesis.

## 3. RESULTS

Table 1 shows age and sex-related prevalence of faecal occult blood among the pupils. Out of 400 pupils sampled between ages 7-15 years, 58 (14.5%) had occult blood. Thirty nine (16.8%) of males have occult blood in their stool samples compared to 19 (11.3%) females with the same problem. However, there is no significant difference between the sex of the pupil and the prevalence rate of faecal occult blood (*P-value* > 0.05). Prevalence rate was highest (21.1%) between ages 7-9 years and least (11.8%) between ages 10-12 years. There is significant difference between the age groups and the prevalence rate of faecal occult blood among the pupils (*p-value* = 0.007).

Table 2 shows the prevalence of faecal occult blood in relation to parent's occupation. The result showed that the children whose parents were traders recorded the highest prevalence (27.5%) compared to 13.3% recorded for children whose parents were civil servants. The

statistical analysis showed there is significant difference between the occupation of the parents of the pupils and prevalence rate of faecal occult blood (P-value = 004).

**Table 1. Age and sex-related prevalence of Faecal occult blood among the pupils**

Variables	Number examined	Number positive (%)	P-value
<b>Age</b>			
7-9	114	24(21.1)	P= 0.007
10-12	152	18(11.8)	
13-15	134	16(11.9)	
Total	400	58(14.5)	
<b>Sex</b>			
Male	232	39(16.8)	P= 0.101
Female	168	19(11.3)	
Total	400	58(14.5)	

**Table 2. Prevalence of Faecal occult blood based on parent's occupation**

Occupation of parents	Number examined	Number positive (%)
Civil/public servants	150	20(13.3)
Traders	120	33(27.5)
Artisans	130	25(19.2)
Total	400	58(14.5)

$P= 0.004$ ;  $t = 15.119$

Prevalence rate of faecal occult blood based on schools is shown in Table 3. The result showed that Etche Road Primary school had the highest prevalence of 19.0%, followed by Clifford Road Primary School (15.7%) while Constitution Primary School recorded the least with 11.2%. There is significant difference between the school attended by the pupils and prevalence of faecal occult blood (P-value = 0.041).

**Table 3. Prevalence rate of Faecal occult blood based on schools**

Schools	Number examined	Number infected (%)
Constitution primary school	178	20(11.2)
Clifford road primary school	140	22(15.7)
Etche road primary school	82	16(19.5)
Total	400	58(14.5)

$P= 0.041$ ,  $t = 4.777$

#### 4. DISCUSSION

There are many causes and possible clinical scenarios associated with gastrointestinal bleeding. Bleeding might be massive or occult. Occult bleeding itself is not a disease but a pointer to various disease conditions like gastric or duodenal ulcers, bacterial and parasitic infections etc. The present study was carried out to assess the prevalence rate of faecal occult blood among asymptomatic primary school pupils in Aba South LGA, Abia State, Nigeria. The result showed a 14.5% prevalence rate with the males (16.8%) having more positive FOB than the females (11.3%). Previous studies have shown that *H. pyloric* and helminthic infections are endemic in the studied area [3,19]. It is therefore not surprising that a high prevalence rate of FOB was obtained. However, it is important that the pupils undergo further medical tests such as hematological tests and microscopic examination of the stool samples to confirm the cause of the bleeding. Thorn et al [20] observed a two-fold higher detection rate of FOBT in males compared to females. However, this result revealed that faecal occult blood is not affected by sex. The results also revealed a higher prevalence rate with age group 7-9 years compared to other age groups. Children whose parents were traders had the highest prevalence rate (27.5%) while children of civil/public servants had the least prevalence (13.3%). This could be explained based on the educational levels of the parents. Although, we did not include the educational levels of the parents, but we know in Nigeria, civil and public servants at least have the basic primary school education compared to artisans and traders who are mostly illiterates, and therefore not capable of maintaining proper personal and environmental hygiene which promote the infection of bacterial and intestinal parasites. Based on schools, Constitution Primary School situated in a government reserved area had the least prevalence rate while Etche Road Primary School situated in one of the most remote and populated areas had the highest prevalence rate (19.5%). Amaechi et al [2] recorded a prevalence rate of 75.7% on helminthic infection among school children in some rural communities in Abia State. Another survey carried out in Aba also showed high prevalence rates of parasitic and bacterial infections among primary schools [19]; suggesting that helminthic and bacterial infections could be the likely cause of FOB prevalence in this area. Clifford Road and Etche Road Primary Schools are located in very dirty

and poorly drained areas, prone to infections especially geohelminthic and bacterial infections. Constitution Primary School located within the government reserved area had cleaner environment with good drainage system. Thus, the problem resulting from the positive FOB obtained in this study could be linked to poor personal hygiene and sanitary conditions which favour bacterial and parasitic infections.

## 5. CONCLUSION

The faecal occult blood test detects small amounts of blood in faeces that is not visibly apparent. An overall prevalence rate of 14.5% FOB in these primary schools observed in this survey requires serious attention. Although, School-based deworming programme have been on-going for some time, the effectiveness is somehow questionable. FOBT confirmed by microscopic examination of the stool samples will help to determine whether the infections are bacterial or parasitic. The iFOBT used in this study is simple and affordable and could be easily used on a large population. It is therefore necessary that FOBT be included as part of school based health programmes in our primary schools to further enhance their health treatment programmes.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Rockey DC. Occult and obscure gastrointestinal bleeding: Causes and clinical management. *Nat Dev Gastroenterol Hepatol.* 2010;7:265-279.
2. Amechi EC, Ohaeri CC, Ukpai OM. Prevalence of helminthiasis among school children is some rural communities of Abia State, Nigeria. *Animal Research International.* 2013;10(3):1817-1825.
3. Ezeigbo OR, Ezeigbo IC. Prevalence of *Helicobacter pylori* and its associated peptic ulcer infection among adult residents of Aba, Southeastern Nigeria. *Int. J. Curr. Microbiol. App. Sci.* 2016;5(6):16-21.
4. Taylor DN, Parsonnet J. Epidemiological and natural history of *Helicobacter pylori* infections. In M. J. Blaser, P. F. Smith, J. Ravdin, H. Greenberg and R. L. Guerrant (ed). *Infections of the gastrointestinal tract.* Raven Press, New York. 1995;551-566.
5. Konturek JW. *Helicobacter pylori* and its pathogenicity role in peptic ulcer, gastritis and gastric cancer. *J. Physio-pharmacol.* 2008;54(Suppl. 3):23-41.
6. de Oliveira EP, Burini RC. The impact of physical exercise on the gastrointestinal tract. *Curr Opin Clin Nutr Metab Care.* 2009;12(5):533-538.
7. Singh M, Beg M, Saraswat MK, Rewari BB. Occult gastrointestinal bleeding; detection, interpretation and evaluation. *J Ind Acad Clin Med.* 2002;3(2):153-158.
8. Rockey DC. Occult gastrointestinal bleeding. *N Engl J Med.* 1999;341(1):38-46.
9. Kirchner J. Faecal occult blood testing to screen for colon cancer. *American Family Physician (Online Series);* 2001. Available:<http://www.aafp.org>
10. Rockey DC, Cello J. Evaluation of gastrointestinal tract in patient with iron-deficiency anaemia. *N Engl J Med.* 1993;329:1691-1695.
11. Quintero E. Test químico o test inmunológico para la detección de sangre oculta en heces en el cribado del cáncer colorectal? *Gastroenterología Hepatología.* 2009;32(8):565-576.
12. Duff MJ, Leo GM, van Rossum, Sietze T, van Turenhout, Outi M, Sturgeon C, Lamerz R, Nicolini A, Haglund C, Holubec L, Fraser CG, Halloran SP. Use of faecal markers in screening for colorectal neoplasia: A European group on tumor markers position paper. *International Journal of Cancer.* 2011;128(1):3-11.
13. Rabeneck L, Rumble RB, Thompson F, Mills M, Oleschuk C, Whibley A, Messersmith H, Lewis N, The FIT Guidelines Expert Panel. Faecal immunochemical tests compared with guaiac faecal occult blood tests for

- population-based colorectal cancer screening. *Can J Gastroenterol.* 2012;26(3):131-147.
14. Castiglione G, Grazzini G, Miccinesi G, Rubeca T, Sani C, Turco P, Zappa M. Basic variables at different positivity thresholds of a quantitative immunochemical test for faecal occult blood. *J Med Screen.* 2002;9:99–103.
  15. Seifert B. *Colorectal cancer screening.* Prague: Maxdorf Publishing; 2013.
  16. Rockey DC, Auslander A, Greenberg PD. Detection of upper gastrointestinal blood with fecal occult blood tests. *Am J Gastroenterol.* 1999;94:344–50.
  17. Fraser CG, Allison JE, Young GP, Halloran SP. Newer fecal tests: Opportunities for professionals in laboratory medicine. *Clin Chem.* 2012;58:963–965.
  18. van Rossum LG, van Rijn AF, Laheij RJ, van Oijen MG, Fockens P, van Krieken HH, Verbeek AL, Jansen JB, Dekker E. Random comparison of guaiac and immunochemical fecal occult blood tests for colorectal cancer in a screening population. *Gastroenterology.* 2008;135: 82–90.
  19. Okike-Osisiogu FU. Control of human parasites and bacteria through school-based health services in Aba, Abia State. Ph.D Thesis, Imo State University, Owerri, Nigeria; 2017.
  20. Thorn M, Bergstrom R, Kressner U, Sparen P, Zack M, Ekblom A. Trends in colorectal cancer incidence in Sweden 1959-93 by gender, localization, time period and birth cohort. *Cancer Causes Control.* 1998;9:145-152.

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