



## Unsedated Colonoscopy: Experience from an Endoscopy Centre

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### Authors' contributions

This work was carried out in collaboration between all authors. Author AOA designed the study, wrote the protocol, performed the endoscopy and wrote the first draft of the manuscript. Author PTA was involved in study design and managed the literature searches. Author EAA performed the statistical analysis and managed the analyses of the study. Author OAS was involved in writing the study design and protocol while author EU assisted in the endoscopy and data collection. All authors read and approved the final manuscript.

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### ABSTRACT

**Aim and Objective:** Colonoscopy is generally considered a painful procedure requiring sedation. Due to the high cost of sedation colonoscopy, coupled with the attendant morbidity and mortality, there is a general trend towards unsedated colonoscopy. The aim of this study was to determine the effect of unsedated colonoscopy on the success of caecal intubation, factors predictive of painful procedure and to compare with results elsewhere.

**Materials and Methods:** Forty one consecutive patients who underwent colonoscopy were recruited into this study. The study was carried out at a privately owned low-volume endoscopy centre: Gilead specialist hospital (GSH), Ado-Ekiti, Nigeria from January

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2010 to December 2011. Ethical approval for the study was obtained from the centre's Research and Ethics Committee and all the patients gave their individual written consent. SPSS version 15.0 (SPSS, Inc., Chicago, Illinois, USA) was deployed for statistical analysis using the t-test for quantitative variables and  $\chi^2$  test for qualitative variables. Differences were considered to be statistically significant if P value was less than 0.05.

**Results:** The male: female ratio was 1.93:1. The mean age of the studied population was  $53.20 \pm 9.53$  years [age range from 30-71]. The indications for colonoscopy were; lower gastrointestinal bleeding (41.5%), abdominal pain or discomfort (19.5%), diarrhea (12.2%), suspected cancer [Patients with history of GI bleeds, weight loss, recurrent diarrhoea and ileus (12.2%), constipation (7.3%) and routine examination (7.3%). Overall, caecal intubation was achieved in 70.7% of cases while in 29.3% caecal intubation was unsuccessful. With on demand analgesia, and exclusion of both cases of obstruction (tumors) and poor bowel preparations, caecal intubation rate rose to 94.3%. Causes of unsuccessful caecal intubation included: abdominal pain or discomfort (33.3%), bowel obstruction (25%), poor bowel preparation (16.7%), anxiety (6.6%) and obesity (8.3%). Colonoscopy findings were haemorrhoids (36.6%), polyps (17.1%), colorectal cancer (14.6%), arteriovenous malformations (7.3%), anal fissure (4.9%), inflammatory bowel disease (2.4%) and normal findings (17.1%). Bowel preparation was adjudged adequate in 80.5% (33/41) of the patients. Female gender and abdominal pain as indication for colonoscopy were found to be predictive for painful colonoscopy ( $p < 0.05$ ).

**Conclusion:** Unsedated colonoscopy with on demand analgesia is advocated in resource poor countries to minimize the direct and indirect costs of colonoscopy. It is also recommended to minimize patient burden in screening and surveillance colonoscopy. Colonoscopists are advised to use the warm water (37°C) method in this setting as against the traditional air insufflations to achieve a high success rate of caecal intubation.

**Keywords:** *Unsedated colonoscopy; caecal intubation rate; warm water method; Gilead specialist hospital.*

## 1. INTRODUCTION

Colonoscopy was initially developed as an unsedated procedure [1]. Due to failure in a minority of early cases as a result of patient anxiety and discomfort especially on sigmoid intubation; sedation was introduced [2-3]. The increasing trend to perform sedated colonoscopy than unsedated, has an impact on the high cost of the procedure which might not be feasible for the people in developing world [4]. In the United States, gastroenterologists perform unsedated colonoscopy only in 2-6% of cases [5]. In the United Kingdom, sedation colonoscopy is a common practice [6] unsedated or on demand sedation colonoscopy is routine practice in other European and Eastern countries. In Finland only 6% of colonoscopies are performed with sedation [7], whereas in Norway the mean sedation rate is 37% [8]. A recent Italian report showed that 45% of patients underwent colonoscopy without sedation [9]. In the primary care literature in the US, sedation has been identified as a barrier to colonoscopy screening of colorectal cancer, [10] wherein, 14% of the patients cited the need for an escort and time-off after sedation as the reasons for non-adherence to the recommended screening.

It has been estimated that between 50% and 60% of all morbidity and mortality occurring during endoscopic procedures is directly related to the administration of sedatives and narcotics [11,12]. Morbidity and mortality due to sedation are mostly related to hypoxemia [13-15]. Sedation colonoscopy increases the total cost, the pre-procedure preparation, total procedure time, and post-procedure recovery [16-18]. These drawbacks are avoided in unsedated colonoscopy. In the unsedated patients, communication is facilitated, so also is position change during the procedure, which has been shown to improve visibility and adenoma detection rate [19-20].

In Nigeria, literature is very scanty on the outcome of both sedated and unsedated colonoscopy. The aim of this study was to determine the effect of unsedated colonoscopy on the success rate of caecal intubation at our centre and to compare it with results from other parts of the world.

## **2. MATERIALS AND METHODS**

Forty one consecutive patients who underwent colonoscopy were recruited into this study. The study was carried out at a privately owned low-volume endoscopy centre: Gilead specialist hospital (GSH), Ado-Ekiti, Nigeria from January 2010 to December 2011.

As a routine, colonoscopy is done in this centre as an unsedated procedure to minimize direct and indirect costs of colonoscopy, but on demand analgesia is given as requested. At the point of recruitment, patient characteristics including age, gender, and mode of presentation (abdominal pain, rectal bleeding, diarrhea or constipation) were collected.

A completed procedure was defined as the ability to visualize the caecum. Any procedure that could not reach the caecum was considered incomplete. The reasons for incomplete colonoscopies and sites reached in incomplete examinations were all recorded. Satisfaction of the bowel preparation was also documented. The procedure was carried out using video-colonoscopes (CF 130 Olympus). Colon preparation was achieved by the oral administration of 3 liters of Movicol (a laxative manufactured by Norgine, UK containing macrogol [polyethylene glycol], sodium bicarbonate, sodium chloride and sodium chloride) and Ducolax (bisacodyl) suppository, given 12-18 hours before the examination. Blood pressure and oxygen saturation were monitored with the pulse oxymeter. Warm water (37°C) infusion method was used instead of the traditional air insufflations.

Ethical approval for the study was obtained from the centre's Research and Ethics Committee and all the patients gave their individual written consent. SPSS version 15.0 (SPSS, Inc., Chicago, Illinois, USA) was deployed for statistical analysis using the t-test for quantitative variables and  $\chi^2$  test for qualitative variables. Differences were considered to be statistically significant if P value was less than 0.05.

## **3. RESULTS**

Forty one consecutive patients comprising twenty seven males and fourteen females who underwent colonoscopy done were recruited into this study. The male: female ratio was 1.93:1. The mean age of the studied population was 53.20±9.53 [age range from 30-71]. Majority of the patients were in the age group 41-60 Table 1. The indications for colonoscopy were; lower gastrointestinal bleeding (41.5%), abdominal pain or discomfort (19.5%), diarrhea and suspected cancer [Patients with history of GI bleeds, weight loss, recurrent diarrhoea and ileus] (12.2% each), constipation (7.3%) and routine examination (7.3%) See Fig. 1. Caecal intubation was achieved in 70.7% of cases while in 29.3% caecal intubation

was unsuccessful. With on demand analgesia, and exclusion of both cases of obstruction (tumors) and poor bowel preparations, caecal intubation rose to 94.3%. Caecal intubation increases with advancing age see Table 2.

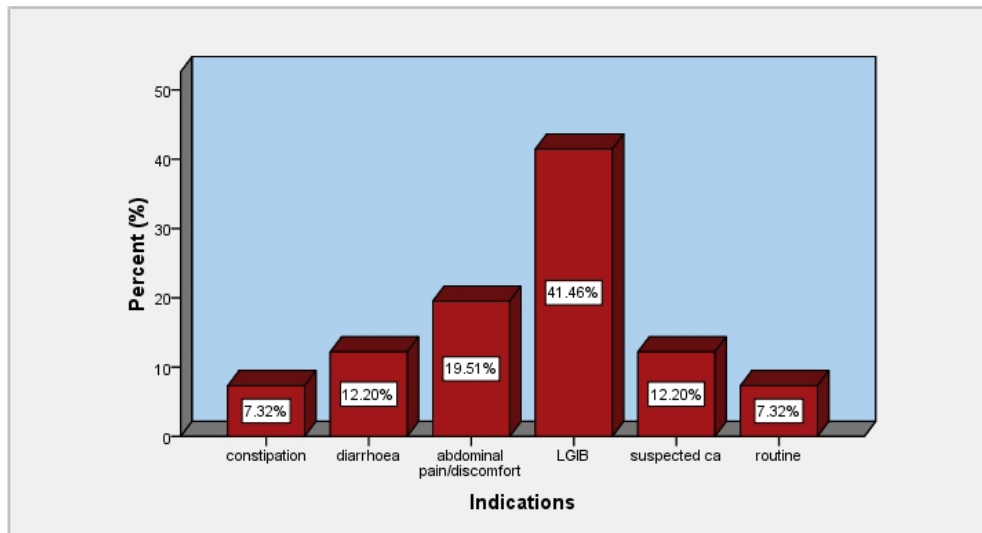
**Table 1. Age group and gender distribution**

Age Group	Female	Male	Total
21-40	0	4	4
41-60	11	17	28
61-80	3	6	9
Total	14	27	41

**Table 2. Age group and caecal intubation**

Age group	Caecal intubation		Total
	Yes	No	
21-40	2	2	4
41-60	18	10	28
41-80	9	0	9
Total	29	12	41

Causes of unsuccessful caecal intubation included the following; abdominal pain or discomfort (33.3%), obstruction (25%), poor bowel preparation (16.7%), anxiety (6.6%) and obesity (8.3%) see Fig. 2. The procedure was abandoned due to the above reasons at the descending colon (8.3%), splenic flexure (8.3%), transverse colon (33.3%), hepatic flexure (8.3%) and ascending colon (41.7%). Colonoscopy findings were haemorrhoids (36.6%), polyps (17.1%), colorectal cancer (14.6%), arteriovenous malformations (7.3%), anal fissure (4.9%), inflammatory bowel disease (2.4%) and normal findings (17.1%) see Fig. 3. Bowel preparation was adjudged adequate in 80.5% (33/41) of the patients. No complications occurred in any of the patients during the procedure. Female gender and abdominal pain as indication for colonoscopy were the most important risk factors for painful colonoscopy.



**Fig. 1. Showing indications for colonoscopy**

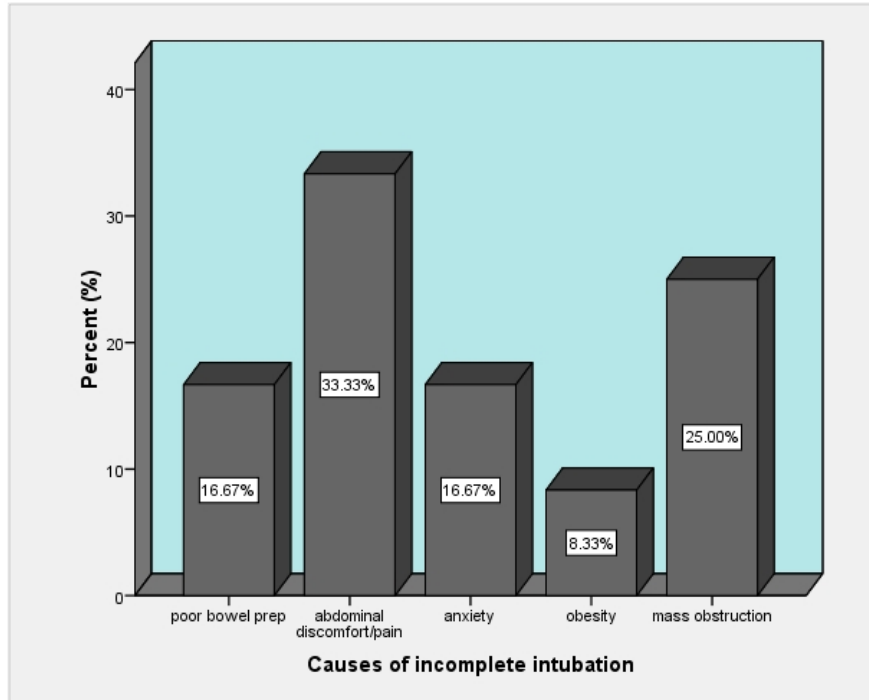


Fig. 2. Causes of incomplete caecal intubation

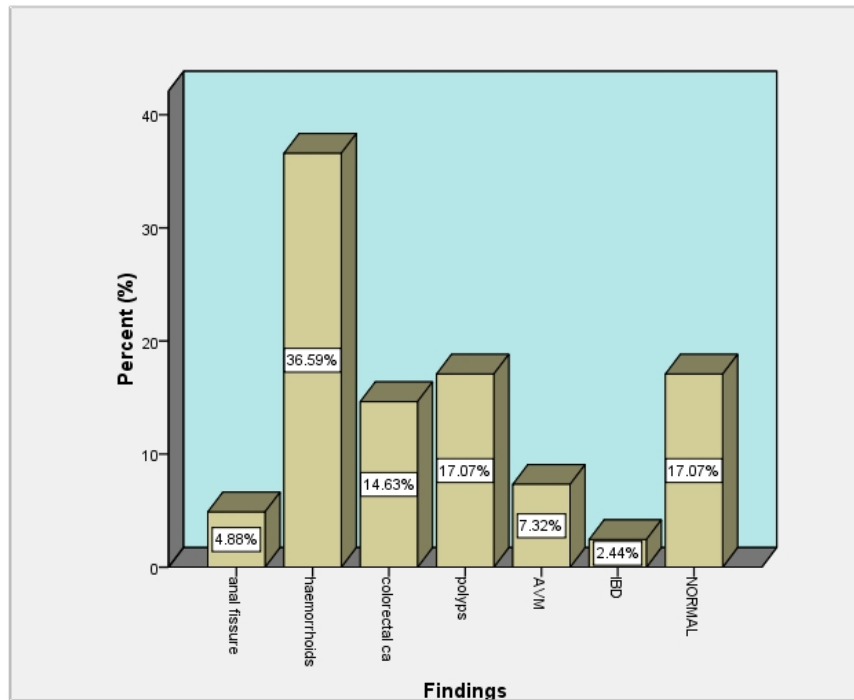


Fig. 3. Colonoscopy findings

In the Univariate analysis, indication for colonoscopy was found to be statistically significant to caecal intubation ( $\chi^2=16.971$ ,  $p=0.005$ ,  $\alpha=0.05$  i.e. 95% confident interval). Also, indication for colonoscopy was equally statistically significant to the findings at endoscopy ( $\chi^2=45.742$ ,  $p=0.03$ ,  $\alpha=0.05$  i.e. 95% confident interval). Age and gender were not statistically significant to the success of caecal intubation ( $\chi^2=5.117$ ,  $p=0.07$ ,  $\alpha=0.05$  i.e. 95% confident interval and  $\chi^2=0.427$ ,  $p=0.38$ ,  $\alpha=0.05$  i.e. 95% confident interval respectively). Female gender and abdominal pain as indication for colonoscopy were found to be predictive for painful colonoscopy ( $p<0.05$ ).

#### **4. DISCUSSION**

Unsedated colonoscopy is available in many parts of the world. It has been an evolving subject since its description about 45 years ago and procedural difficulty led to the introduction of sedation. Worldwide, the success rate of unsedated colonoscopy have been reported to be in the range of 67% [21] -83% [22]. Overall, the success rate of caecal intubation in this study was 70.7%. This was lower than the 80% obtained by Leung et al. [23] and the 82.66% obtained by Bayupumama et al. [24]. The caecal intubation rate obtained in our study was higher than the 67% obtained by Aljebreen [21]. With on demand analgesia and the exclusion of both cases of obstruction (tumors) and poor bowel preparations, caecal intubation rate rose to 94.3%. The advantages of the unsedated colonoscopy are sedation risk-free, patient is fully conscious to follow the examination, easier to change patient's position during examination, lower cost, and patient can be back to work and drive as soon as the procedure was finished, also patient may come for examination unescorted. The main disadvantage of this procedure that differentiates it from deep sedation is the abdominal pain or discomfort that cannot be overcome by patient. This may be caused by technical difficulties or patient distress.

The indications for colonoscopy were; lower gastrointestinal bleeding (41.5%), abdominal pain or discomfort (19.5%), diarrhea and suspected cancer [Patients with history of GI bleeds, weight loss, recurrent diarrhoea and ileus] (12.2% each), constipation (7.3%) and routine examination (7.3%); this is similar to the findings of Aljebreen [21]. Female gender and abdominal pain as indication for colonoscopy were the most important risk factors identified for painful colonoscopy in this study and this is similar to that found in the studies of Holme et al. [25], Eckardt et al. [26] and Elphick et al. [27]. No complications occurred in any of the patients during the procedure.

Colonoscopy findings were haemorrhoids (36.6%), polyps (17.1%), colorectal cancer (14.6%), arteriovenous malformations (7.3%), anal fissure (4.9%), inflammatory bowel disease (2.4%) and normal findings (17.1%). This is similar to the findings in the West African sub-region by Olokoba et al. [28], Alatisse et al. [29] and Dakubo et al. [30].

In our study, warm water (37°C) infusion method was used as against the traditional air insufflations for colonoscopy. This significantly gave a better patient procedure tolerance, better evaluation of the mucosal wall and adenoma detection rate. Studies from United States [31], Italy [32] and Deutschland [33] using warm water (37°C) method also demonstrated that the method was associated with a decreased request for medications, better procedure tolerance and higher caecal intubation rate. Similar results were obtained using either warm water infusion or CO<sub>2</sub> insufflations during unsedated colonoscopy [34]. The adenoma detection rate in this study was high. Studies have shown that pain reduction during insertion was higher when suction of the infused water was performed during the insertion phase (water exchange) than during the scope withdrawal phase (water immersion)

56% vs 27% [35]. This technique has also been associated with increased adenoma detection rate and minimizes colonic spasms.

## **5. CONCLUSION**

Unsedated colonoscopy with on demand analgesia is advocated in resource poor countries to minimize the direct and indirect costs of colonoscopy. It is also recommended to minimize patient burden in screening and surveillance colonoscopy. Colonoscopists are advised to use the warm water (37°C) method in this setting as against the traditional air insufflations to achieve a high success rate of caecal intubation.

## **CONSENT**

All authors declare that 'written informed consent was obtained from all the patients (or other approved parties) for publication of this article.

## **ETHICAL APPROVAL**

All authors hereby declare that the study protocol have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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