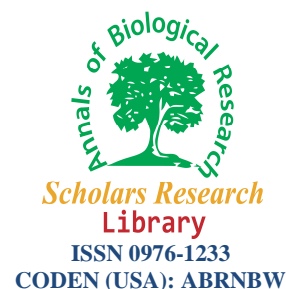




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Microorganisms and parasitic worms associated to anal infections among children in relation to disposable and non-disposable diapers in Shendam, Plateau State of Nigeria

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ABSTRACT

Anal infections among children residing in Shendam town, Plateau State was investigated. A total of 380 subjects were tested in this study, comprising of children that were aged 0-60 months that attended clinics, laboratories, schools and day-care centers in Shendam town. Stool and swab samples were collected in duplicates from the subjects and the samples were subjected to simple and concentration microscopic techniques, culture and biochemical analyses. The organism with the highest percentage of 64.2% was *Candida albicans* which was recorded in disposable diapers (pampers). Lowest percentage (5.7%) of *C. albicans* was recorded in children that do not use neither disposable nor non-disposable diapers. Highest percentage (66.7%) of *Staphylococcus aureus* was also isolated from children that used non-disposable diapers (rags). *E. histolytica*, *Streptococcus pyogenes* was also isolated. In this study, it was revealed that leaving disposable and non-disposable diapers on children for a very long time potentiated the growth of these organisms which took advantage of the warm and moist environment. Unhygienic ways of handling non-disposable diapers (rags) accounted for the highest percentage of *S. aureus* because this organism is associated to man. Ova of parasitic worms were also found in diapers of these children. Highest percentage (80%) of *A. lumbricoides* was recorded in children that do not use diapers at all. Anal infections from unknown sources (idiopathic) had the highest percentage of 53.3% with children that used disposable diapers. Other parasitic worms like *Trichomonas hominis*, *Taenia* species, and *Strongyloides stercoralis* were isolated but in very low percentages. The occurrence of the ova of these worms in disposable and non-disposable diapers could be as a result of unhygienic measures employed in feeding these children and handling of diapers. It was revealed from this study that there was significance difference ($P < 0.05$) in the percentage of *C. albicans* as compare to other organisms in children that used disposable diapers. Therefore disposable pampers should not be left on children for too long in order to create a healthy skin around the anal areas of children.

Key words: Anal Infections, disposable and non-disposable diapers, microorganisms, children, parasitic worms

INTRODUCTION

The word anus was derived from the latin word "Anis" meaning ring "circle" It is the external opening of the rectum [1]. Two sphincters control the exit of faeces from the body during an act of defecation, which is the primary function of the anus. Anal area is the part of the body around the anus [1]. A diaper is a type of disposable and non-disposable underwear that allows one to defecate or urinate, without the use of a toilet [2]. When diapers become

soiled, they require changing, generally by a second person such as a parent or caregiver. Failure to change a diaper on a sufficiently regular basis can result in skin problem around the area covered [2]. Anal infections in children are commonly caused by yeast, which is a type of overgrowth in children caused by *Candida* species. *Candida* is a fungal microorganism that is typically found in warm, moist places such as in the mouth and anal areas of babies who are continually wrapped with diapers and not left dried [3]. Ova of parasitic worms also can be found on diapers especially the non-disposable types as a result of unhygienic ways of handling and washing. Ova of parasitic worms can also be found on diapers if babies are infected with these worms through toys and unhygienic ways of feeding. Therefore ways of detecting organisms associated to disposable and non-disposable diapers and eliminating them is a headway in keeping skin around the anal areas of our children healthy.

MATERIALS AND METHODS

Sample Collection

Stool and swab samples were collected in duplicate using sterile bottles. Swabs of the anus were made using sterile swab sticks when the child was unable to defecate. Samples were transported to the laboratory for cultural and microscopic analyses.

Wet Mount Preparation

The swabs and the stool samples were subjected to direct wet mount examination. A drop of normal saline was made on a clean grease-free microscope slide. A small sample of the stool was picked with an applicator stick and a homogenous mixture was made. A clean cover slip was applied gently on to the emulsified mixture, avoiding air bubbles. The prepared slides from stool and swab sticks was examined using X4, X10 and X40 objective lenses of the light microscope [4].

Concentration Method

Formalin-ether sedimentation technique: 0.5 g of stool was transferred to 10ml of 10% formalin in a 15ml test tube that was mixed and allowed to stand for 30 minutes for adequate fixation. The faecal suspension was strained through two layers of gauze in a funnel into a centrifuge tube. 4ml of diethyl ether was added, the tube was closed with a glass stopper and shaken well for 30 seconds. The stopper was removed gently, holding the tube in such a way that the stopper was directed away from the face. The tube was centrifuged for 3 minutes at 500g. The plug of debris was loosened from the side of the tube using an applicator stick and the tube was then inverted rapidly to pour off the ether, debris and the formalin. All the sediment was transferred on to a slide, covered with a cover slip and examined for parasites as was done with the wet preparation [5].

Culture Technique

Stool samples were cultured directly and were not subjected to the routine stool cultural procedures of inoculation into selective medium which would kill the *Streptococci* present [6]. Sabouraud dextrose agar and blood agar plates were used to inoculate the swab and stool samples. Plates were incubated at 37°C for 24hrs for isolation of bacteria, for isolation of fungi, plates were incubated at room temperature for 3-5 days at 25°C. The colonies were Gram-stained and examined using oil immersion objective lenses. The blood agar plates were observed for beta haemolytic colonies which were further confirmed using bio-chemical tests such as catalase, coagulase and germ tube tests [4].

Statistical tool used

Results were collated and analysed using SPSS version 16.0. The values were expressed in means and percentages. Chi-square and ANOVA was used and level of significant of $P < 0.05$ was employed.

RESULTS AND DISCUSSION

Table 1: Anal infection among children in relation to disposable and non-disposable diapers

| Infection | Disposable Pampers (%) | Non- disposable Napkins (%) | Rags (%) | None (%) | Total (%) |
|--------------------------|------------------------|-----------------------------|----------|----------|------------|
| <i>C.albicans</i> | 170(64.2) | 60(22.6) | 20 (7.6) | 15(5.7) | 265 (64.3) |
| <i>E.histolytica</i> | 43 (63.2) | 14(20.6) | 2(2.9) | 9 (13.2) | 68 (16.5) |
| <i>G.lambli</i> | 5 (50) | 20(20) | 1 (10) | 2 (20) | 10 (2.4) |
| <i>T. hominis</i> | 2(100) | 0 (0) | 0 (0) | 0 (0) | 2 (0.5) |
| <i>A.lumbricoides</i> | 1 (20) | 0 (0) | 0 (0) | 4 (80) | 5 (1.2) |
| <i>S.stercoralis</i> | 1 (100) | 0 (0) | 0 (0) | 0 (0) | 1(0.2) |
| <i>Taeniaspp</i> | 1 (100) | 0 (0) | 0 (0) | 0 (0) | 1(0.2) |
| <i>S. aureus</i> | 0 (0) | 1 (11.1) | 6 (66.7) | 2 (22.2) | 9 (2.2) |
| Beta haem. <i>Strept</i> | 0 (0) | 2 (33.3) | 3 (50) | 1 (16.7) | 6 (1.5) |
| Idiopathic | 24(53.3) | 6 (13.3) | 3(6.7) | 12(26.7) | 45(10.9) |
| Total | 250(60.7) | 40 (9.7) | 30(7.3) | 92(22.3) | 412(100) |

$F_{cal.} = 8.5969, F_{tab.} (3, 28) = 2.69 P < 0.05. LSD = 35.100$

DISCUSSION

Microorganisms and parasitic worms commonly associated with disposable and non-disposable diapers were carried out on children in Shendam town, Plateau State. Results from this study revealed that highest percentage (64.2%) of *C.albicans* was recorded in disposable diapers followed by non-disposable (napkin) with a percentage of 22.6%. Lowest percentage 5.7% of *C.albicans* was recorded from those that do not use diapers at all. Highest percentage of *C.albicans* with disposable diapers could be as a result of the fact that disposable pampers has a gel material that draws moisture away from the skin area thus promoting a healthy diaper area [3]. This advantages made mothers in rural communities to change only when babies or children defecate, this can take more than 12 hours. Once the anal area is left warm and moist for a long time, it potentiates the growth of this organism. The lowest percentage of this organism from those that don't use diapers at all could be as a result of the believe by some mothers that keeping the anal area dry is a measure towards preventing anal infections. This is true because once the anal area is dry, it becomes unfavorable for the growth of *C.albicans*. *E.histolytica* had the highest percentage of 63.2% with those that used disposable diapers, growth of this organism and other organisms could be as a result of favorable conditions created by diapers. It could also be as a result of poor hygiene during feeding and handling of children. Percentage of *S.aureus* was highest (66.7%) with those that used non-disposable diapers (rags). This could be attributed to frequent handling, as this organism is found to be associated to man. Highest percentage of *A.lumbricoides* was recorded among children that don't use diapers at all. This could be due to exposure of anal areas to the soil or ground thereby making ova of this worm to penetrate children. Ova of some parasitic worms can be found to also penetrate broken skin.

There were six (6) isolates of Beta-hemolytic *Streptococci* which was 1.5 % of the total cases identified. This agrees with the finding by [7] on perianal dermatitis. The rate in this study was higher than the range of 1 in 2000 to 1 in 200 patients visits reported by [8]. This can be attributed to the differences in the climatic, environmental and sanitation of the study populations as the study by Lawrence was carried out among children in developed, hygiene-conscious communities in temperate climate. This study was carried out in a rural community with poor hygiene, poor water supply and in a hot tropical climate.

The fact that a significant number of the children had anal itching that the causes could not be detected is in line with the information given by [9], that many causes of anal itching are not clear and are idiopathic in nature.

CONCLUSION

It has been concluded from this study that *Candida albicans* the most common organism among children in Shendan that used disposable and non-disposable diapers. Other bacteria such as *Staphylococcus aureus* and β -hemolytic *Streptococci* were also isolated from anal infections of these children. Parasitic worms also found to be associated to anal infections from these children were *Entamoeba histolytica*, *Giardia lamblia*, *Trichomonas hominis*, *Ascaris lumbricoides*, *Strongyloides stercoralis* and *Taenia* species. In addition to microorganisms and parasitic worms isolated, were idiopathic cases.

REFERENCES

- [1] W James T, Berger, D Elson. *Andrews' Diseases of the skin; Clinical Dermatology*. (10thed.). Saunders. **2005** ISBN O-7216-2921-0
- [2] C Lehrbuger, CV Jones, J Mullen. *Diapers. Environmental Impact and Lifecycle Analysis*. **1999**.
- [3] KA Horii, and TA Prossick. *Overview of diaper dermatitis in infant and children*. **2013**.
- [4] FJ Baker and MR Breach. (1985). *Microbiological techniques* (3rded) Butter worth. **1985** pg 285
- [5] J Ochei and A Kolhatkar. *Medical Laboratory Science Theory and Practice* 6th reprint. Tata Mcgraw-Hill publishing Company Limited, New Delhi. **2007**. Pp 648-649, 948-949
- [6] A Barzilai and HA Choen. Isolation of group A streptococci from Children with Perianal Cellulitis and from their Siblings. *Pediatr Infect Dis J*. **1998**. 17:358 -60
- [7] C Lawrence. *Am Fam Physician*. **2000**. 61(2):391-393
- [8] RE Kliegman, B Staton, J Geme NF Schor, RE Behrman. *Nelson Textbook of Pediatrics*. 19th ed. **2011**. Philadelphia; Saunders Elsevier.
- [9] E Prodigy. Pruritus ani (<http://prodigy.clarity.co.uk/pruritus-ani>). **2008**