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Adequacy of Bristol stool form scale in the assessment of stools by mothers of healthy infants in Ibadan, Nigeria

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Abstract: An important complaint of mothers is the stool form of their infants. In the evaluation of stool forms, healthcare workers usually depend on mothers' reports which are subjective and influenced by interpretation bias by health care personnel. There is therefore the need for an objective method of describing stool forms. In the present study, we evaluated the utility of the 7-point Bristol Stool Form Scale (BSFS) when used by mothers of healthy Nigerian infants.

Materials and Methods: The mothers of 122 healthy infants delivered at term, with infants less than six months of age attending the Infant Welfare Clinics of two health facilities in Ibadan, South West, Nigeria for routine immunisation were enrolled. Mothers were requested to identify their child's most recent stool form using the 7-point BSFS.

Results: The mean ± SD age of the 122 study infants was 80 ±41.6 days (range 4-180 days). Eighty-eight (72.1%) infants were exclusively breastfed and 34 (27.9%) were on mixed feeding. Almost all (120; 98.4%) mothers felt that the BSFS adequately described their infants' stools. The most commonly reported stool types were Type 6 (56.7%) and Type 7 (33.3%). There was no association between reported stool consistency and infant feeding type, level of maternal education and number of previous babies nursed.

Conclusion: This study indicated that BSFS may be a reliable tool for mothers to describe stool consistency in healthy Nigerian infants.

Keywords: Stool, Form, Scale, Assessment, Consistency, infant, healthy, interpretation

Introduction

The bowel habit of an individual varies with age, state of health, and diet.[1-3] The colour, consistency and forms of stools compliment the state of health of the gastrointestinal tract as well as gastrointestinal diseases.[4,5] There is considerable variation in the description of stools especially where the local languages are not specific or sufficiently descriptive as a mother's report of infant stools is subjective, time consuming and subject to translation accuracy. Consistency in the reporting of clinical parameters is important both for improving clinical care, epidemiologic studies and as a basis for comparing research findings from different settings.[6]

In the quest for descriptive accuracy, several stool form scales including King's stool chart and BSFS[1] have been developed. The BSFS (Figure 1) is an objective graphic 7-point scale of types of stools according to their shape and consistency. The BSFS has been validated in several studies in Europe and North and South America as well as in Kenya for describing stool consistency in hospital clinics,[6,7] epidemiological surveys,[6,7] health education

campaigns and communication.[6] The stool form scale has been shown to improve the recall of stool forms, communication, attention and comprehension.[8]

Extensive literature search failed to identify a previous evaluation of the utility of the BSFS in Nigerians. Therefore, validation of the BSFS for use in the Nigerian infant will help parents, clinicians and researchers to objectively identify stool forms and monitor progress of this gastrointestinal symptom in health and disease. This study aimed to assess the utility of the BSFS in describing stools of Nigerian infants by evaluating the mothers' perception of the adequacy of the scale and identifying factors in mothers and infants that may influence the mothers' ability to use the BSFS.

Materials and methods

One hundred and twenty-two (122) apparently healthy infants delivered at term and aged less than 6 months attending the Infant Welfare Clinics of Adeoyo Maternity Teaching Hospital and the University College Hos-

pital both in Ibadan, South West, Nigeria were consecutively recruited into the study. A pilot study was undertaken to validate the questionnaire. Subsequently, the validated questionnaire was administered by trained assistants onto the mothers who accepted to participate in the study. The assistants explained the concept of the BSFS as a paper chart representing various stool types each accompanied by written description on a 7 point visual scale ranging from hard (types 1-3) to watery stools (type 7) with intermediate stool forms (types 4-6). [1]Respondents were subsequently asked to study the Bristol Stool Form Scale (BSFS) for a few minutes before identifying which of the stool types adequately described the child's most recent stool form.

Data collected from each participating mother included socio-demographic characteristics of the mothers, number of previous children, feeding history as well as stooling patterns of the index infants. Other information collected were gestational age, date of birth and mothers' level of education.

The study assessed the ability of mothers to use the BSFS by analysing whether reporting of the stool types varied according to the mother's level of education and number of children, categorised as 1 alive, 2-3 alive and >3 alive as a measure of previous experience of infant care. Study also assessed whether reported stool types varied according to the type of feed as either exclusive breastfeeding or mixed feeding. Stools were grouped into types 1-3 (hard constipated stools), types 4-6 (soft normal) and type 7 (watery). Mothers' level of education was grouped as no formal education, primary/secondary and post-secondary.

Results were presented as number and percentage with groups compared using the x^2 test. Age was described as mean ± standard deviation (SD).

Approval for the study was granted by the University of Ibadan/University College Hospital Ibadan Ethics Review Committee.

Results

The age range of infants was 4-180 days with a mean ± SD of 80.0 ± 41.6 days. There were 67 (54.9%) males with a male: female ratio of 1.2:1. All babies had been delivered at term. The mean age of the mothers was 31.2 ± 4.0 years. One hundred and twenty mothers indicated that the BSFS pictorial was sufficiently representative of their infants' stools with only two (1.7%) disagreeing and describing BSFS as not representative. Table 1 shows more than half (56.7%) of the mothers indicated Type 6 and one-third Type 7 and no respondent indicated Types 2 and 4 as representative of their infants' stools.

Fig 1: Bristol Stool Chart
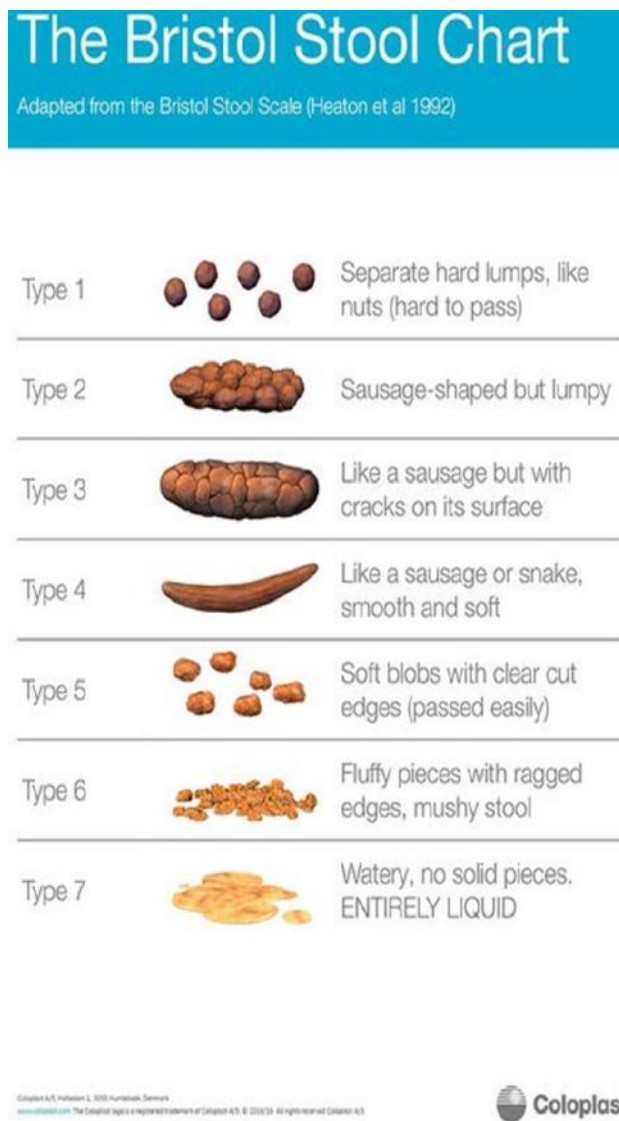
Thirty-five mothers had elementary/secondary level education, 84 post-secondary level education and one respondent had no formal education (Table 2) and education level was not statistically significantly related to reported stool consistency (x^2=2.59, P=0.1; Table 2).Table 2 shows 75 (61.5%) mothers had nursed at least one infant before the study while 47 (38.5%) were having their first infant and mothers' experience in handling infants was not significantly associated with reported stool consistency (x^2=5.64, P=0.23;).Eighty-eight babies (72.1%) were on exclusive breastfeeding and 34 (27.8%) were on mixed feeding and there was no significant association between the type of infant feeds and stool types(x^2=0.181, P=0.67; Table 2).

Table 1: Pictorial Representation of Infant Recent Stool as indicated by 120 Mothers
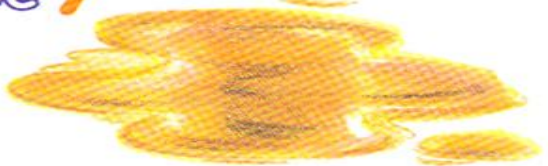
Pictorial Representation of Stool as in BSFS	Number (%) of Mothers that indicated stool forms
type 1	6 (5.0)
type 2	0 (0.0)
type 3	2 (1.7)
type 4	0 (0.0)
type 5	4 (3.3)
type 6	68 (56.7)
type 7	40 (33.3%)

Table 2: Mother and infant factors and reported stool type

Variable	Stool Types			Total N (%)
	1 and 3 N (%)	5 and 6 N (%)	7N (%)	
Level of Education				
Post-secondary	6 (7.1)	45 (53.6)	33 (39.3)	84 (100)
Primary/Secondary	2 (5.7)	26 (74.3)	7 (20.0)	35 (100)
No formal education	0 (0.0)	1 (100)	0 (0.0)	1 (100)
Mode of feeding				
Exclusive breastfeeding	7 (8.1)	51 (58.6)	29 (33.3)	87 (100)
Mixed Feeding	1 (3.0)	21 (63.6)	11 (33.4)	33 (100)
No. Children Alive				
Index baby	5 (10.9)	30 (65.2)	11 (23.9)	46 (100)
2 and 3	3 (5.0)	34 (56.7)	23 (38.3)	60 (100)
>3	0 (0.0)	8 (57.1)	6 (42.9)	14 (100)

Discussion

Stool forms suggest the state of gastrointestinal health and disease either specifically related to the gastrointestinal tract or symptom of other systemic illnesses. It is therefore not surprising that mothers show considerable concerns for stooling patterns and consistency of their infants' stools which may necessitate hospital visitations and/or admissions. To underscore the importance of gastrointestinal symptoms in children, acute diarrhoea constitutes approximately 14% of all annual paediatric visitations to Accidents and Emergency Departments in the United Kingdom,[2] and 6.3% of all hospital visitations by infants aged less than 6 months of age in Ilesa, Southwest Nigeria.[3] Similarly, constipation is the principal complaint of 3 to 5% of visits to paediatric outpatients and as many as 35% of all visits to paediatric gastroenterology clinics in the United States[4] though not commonly reported in Nigerian children. Description of stools can therefore be important in the diagnosis and monitoring of gastrointestinal illnesses.[5]

The description of the consistency of stools is subjective and a further problem in many communities is the difficulty in translating stool consistency as reported in local languages and the appropriate translation or interpretation of the description of stool forms as presented by the mother to the health care provider. This study sought to establish the utility of the BSFS in the stool assessment of healthy Nigerian infants as reported by mothers with different educational background and infant feeding type.

In the present study, the BSFS was reported as being adequate in describing infant stool consistency by all but two mothers, which suggest that it is valid for use in the Nigerian infants notwithstanding the educational background of the descriptor and type of infant feeding. Though the study was not to evaluate the prevalence of stool forms of infants, however, BSFS Type 6 (normal stool form) was described by over half of all mothers with Type 7 (watery stool form) reported by one-third of Nigerian term infants below 6 months of age.
Mother's level of education did not affect her ability to use the chart to rate stool forms as the near universal utility of the BSFS in infants in the present study is similar to the reports of Guled in Kenya,[6] and Chumpitazi et al in Texas, USA.[7] In both reports, mothers with different levels of education understood the chart images and descriptions in a similar way, although, the participants in the reported Kenya and Texas studies[6] were not just mothers of infants.
The result of this study is consistent with the findings by Guled et al[6] in Kenyan children that with or without previous infant care experience, confirms the utility of the BSFS in infants.

Almost three quarters of babies were exclusively breastfed, with the remainder on mixed feeding. Seven (8.1%) infants on exclusive breastfeeding had hard stools (Types 1 and 3) while only one (3%) of the mixed feeding group had hard stool. Loose stools were reported in 29 (33.3%) and 11 (33.4%) in exclusively breastfed and mixed feeding group respectively, however, the type of feeding did not influence the stool form of the infant and the rating by the mother. The result of this study is is consistent with the report by Bekkali et al[8] who found no significant difference in stool consistency and colour between breastfed and formula fed infants while Guled in Kenya[(6)] showed that most of the breastfed infants stools were rated as type six and type seven whereas children who were not breastfed indicated a more spread out rating pattern across stool types.

Limitation

The study did not exclude the use of medications that may impact or influence intestinal transit time.

Conclusions

Mothers of healthy infants less than six months of age were able to describe their infants' stools using the BSFS. Mothers' reporting of stool consistency was not affected by their educational status or previous experience of childcare and the mode of infant feeding. The BSFS might be applicable in the home as well as clinical settings in Nigeria.

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