

**EXCLUSIVE BREAST- FEEDING AMONG MOTHERS AT HEALTH CENTRES
IN THE NORTH CENTRAL REGIONAL HEALTH AUTHORITY IN TRINIDAD
AND ITS ASSOCIATED FACTORS; A CROSS-SECTIONAL STUDY**

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ABSTRACT

Exclusive breast-feeding among nursing mothers at health centres in the North Central Regional Health Authority in Trinidad and its associated factors; a cross-sectional study.

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Despite health promotion initiatives, infant nutrition remains a significant challenge in Trinidad, especially exclusive breastfeeding. The objective of this study is to determine the prevalence of exclusive breast-feeding and significant associated factors influencing exclusive breastfeeding, and to assess the knowledge, attitudes/beliefs and practices of breast-feeding among mothers. A cross-sectional survey was conducted among mothers attending child health clinics at local health centres in North Central Regional Health Authority. Convenience sampling was performed and 240 mothers were interviewed with a pretested questionnaire. The prevalence of exclusive breastfeeding for at least six months was 15.4% with a mean duration of 2.84 months. 96.25 % of mothers initiated breastfeeding whilst 3.75% of mothers have never breastfed their infants. 56% of mothers were still breastfeeding. The main reasons for not exclusively breastfeeding were baby not satisfied (26.5%), insufficient milk (20.1%), and work related reasons (15.3%). Regarding knowledge of breastfeeding and its benefits, mothers were well informed and displayed positive attitudes towards breastfeeding. However 117 mothers (49.5%) agreed that babies need water in addition to breast milk in first six months of life and this was proven to be a positive significant predictor of exclusive breastfeeding ($p=0.003$). Using Chi squared analysis and binary logistic regression, the impact of maternal and paternal socio-demographics and other potential predictors on exclusive breastfeeding were assessed. Positive significant predictors for exclusive breastfeeding were mother's monthly income, marital status, social and financial support, and advice given by family/friends.

Keywords: Exclusive breastfeeding, Infant nutrition, prevalence, knowledge, attitudes/beliefs, breastfeeding practices.

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TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGEMENTS	ii
LIST OF FIGURES.....	v
LIST OF TABLES.....	vi
INTRODUCTION	1
Problem Statement/ Background.....	1
Justification	1
Purpose/ objective	3
LITERATURE REVIEW	5
METHODOLOGY.....	9
Setting and population base.....	9
Inclusion and exclusion criteria.....	9
Sample size calculation	11
INSTRUMENT DESIGN AND TESTING	12
Development of instrument.....	12
Strategies for validity of instrument.....	12
Pilot testing of instrument	14
Analysis strategy	14
ETHICAL CONSIDERATIONS	15
RESULTS.....	16
Demographics of population	16
Breastfeeding practices.....	21
Knowledge about breastfeeding	23
Attitudes /beliefs.....	28
Assessment of predictors.....	29
DISCUSSION.....	35
Impact of the study	41
Limitations and challenges	41
Recommendations	43
CONCLUSION.....	44

REFERENCES	45
APPENDIX A: INSTRUMENT	48
APPENDIX B.....	52

LIST OF FIGURES

<i>Figure 1 Trends in percentage of infants aged 0-5 months exclusively breastfed, by region, around 2000 and around 2015</i>	2
<i>Figure 2 Percentage of exclusively breastfed infants (<6 months) in Trinidad and other Caribbean countries.</i>	4
<i>Figure 3 Flowchart of methodology</i>	10
<i>Figure 4 Socio-demographics of mother</i>	19
<i>Figure 5 Socio-demographics of mother and father</i>	20
<i>Figure 6 Prevalence of breastfeeding (BF)</i>	22
<i>Figure 7 Reasons for not exclusively breastfeeding for six months</i>	23
<i>Figure 8 Maternal benefits of breastfeeding</i>	24
<i>Figure 9 Benefits of breastfeeding for baby</i>	24
<i>Figure 10 Sources of information regarding breastfeeding (N=349)</i>	25
<i>Figure 11 Statement: Babies need water in addition to breast milk in first six months of life.</i>	27
<i>Figure 12 Positive attitudes and beliefs of breastfeeding mothers</i>	29
<i>Figure 13 Percentage of exclusively breastfed infants (<6 months) in Trinidad and other Caribbean countries.</i>	35

LIST OF TABLES

<i>Table 1 Sample Characteristics: socio-demographics of mothers</i>	16
<i>Table 2 Sample characteristics: Socio-demographics of mother and father</i>	18
<i>Table 3 Socio-demographics: Martial status and living arrangements</i>	20
<i>Table 4 Family members providing social and financial support</i>	21
<i>Table 5 Sources of information regarding breastfeeding</i>	25
<i>Table 6 Assessment of mother's knowledge of breastfeeding.</i>	26
<i>Table 7 Attitudes/ beliefs of breastfeeding mothers</i>	28
<i>Table 8 Chi² results for socio-demographics of mothers and exclusive breastfeeding.</i>	30
<i>Table 9 Chi squared analysis of socio-demographics of father and exclusive breastfeeding.</i>	31
<i>Table 10 Column percentages and p values for various predictors and exclusive breastfeeding.</i>	32
<i>Table 11 Odds ratio (OR) and 95% confidence intervals (CI) for various categories.</i>	33

INTRODUCTION

Problem Statement/ Background

Despite health promotion initiatives, infant nutrition remains a significant challenge in Trinidad. Breastfeeding is known to be the ideal nutrition for newborns and infants and it provides numerous benefits and health outcomes for both nursing mother and baby. “ Exclusive breastfeeding is defined as no other food or drink, not even water, except breast milk for at least 4 and if possible 6 months of life, but allows the infant to receive drops and syrups (vitamins, minerals and medicines). "Predominant" breastfeeding means that the infant's predominant source of nourishment has been breast milk. However, the infant may also have received water and water-based drinks (sweetened and flavoured water, teas such as herbal teas, infusions, etc), fruit juice, or ORS solution.” [1]. WHO/UNICEF recommends that infants be breastfed exclusively for the first six months with continued breastfeeding for at least 2 years. [1] American Academy of Paediatrics “recommends that exclusive breastfeeding should be given for 6 months, followed by continued breastfeeding for at least 12 months as complementary foods are introduced and continuation of breastfeeding for as long as mutually desired by mother and baby.” [2]

Justification

Breast milk provides numerous health benefits for both infant and mother. Breast milk gives protection against infectious and chronic diseases hence reducing infant morbidity and mortality from common childhood illnesses such as diarrhoea or pneumonia. It also decreases recovery time, allowing for a faster recovery. It also promotes sensory and cognitive development of the infant. Breastfeeding promotes the health and well-being of mothers. Some positive health outcomes for the mother are: it helps in spacing pregnancies, reduces the risk of ovarian and breast cancer. It increases family and national resources, is a secure way of feeding and is safe for the environment. [1] In young children, a longer duration of breastfeeding appears to offer protection against the development of asthma and wheeze. [3,4] Epidemiological data demonstrates that breastfeeding significantly reduces the incidence of overweight and obesity and that exclusive and long term breastfeeding has been strongly correlated with a reduction in LDL cholesterol, blood pressure related disorders, type 2 diabetes, and cardiovascular dysfunction. [5] There is an alarming increase in childhood obesity in society and these chronic conditions are rampant in our society utilising a large proportion of health care funding and services at both the primary care and tertiary care levels.

UNICEF Global Data Bank on Breastfeeding analysis is based on a subset of 78 countries covering 68 % of the global population (excluding China and Russian Federation) around 2000 (1997-2003) and 70 % around 2015 (2010-2016). There has been minimal improvement in exclusive breastfeeding for the past 15 years with a 7% increase globally. Within the Latin America and Caribbean region, there was a mere 2% increase since 2000. See Figure 1 below depicting trends in percentage of infants aged 0-5 months exclusively breastfed, by region, around 2000 and 2015. [6]

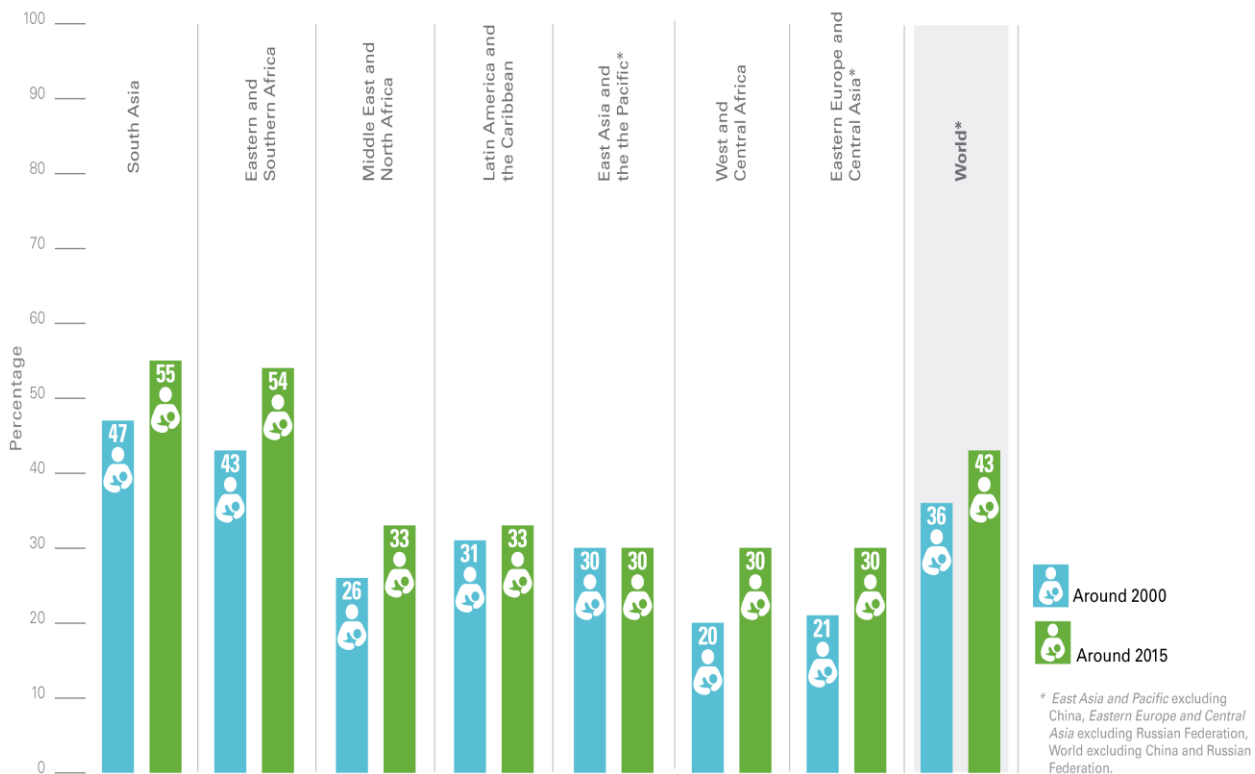


Figure 1 Trends in percentage of infants aged 0-5 months exclusively breastfed, by region, around 2000 and around 2015

By UNICEF global databases, 2016, based on MICS, DHS and other nationally representative source [6]

In the United States according to CDC, there has been an overall trend increase in breastfeeding from 2004 to 2014. The percentage of exclusively breast fed infants through 6 months was 24.9%. The prevalence of breastfeeding initiation increased from 73 % to 83% (2004-2014), breastfed at 6 months increased from 42% to 55% in 2014, and breastfed at 12 months increased to 27.8%. However the breastfeeding prevalence vary by state and among ethnic groups, with black infants having persistently lower rates than among whites and Hispanics. [7]

Regional data gathered by UNICEF Multiple Indicator Cluster Survey (MICS) surveys displayed percentages of infants who were exclusively breastfed less than six months, increased from 15% (2005) to 24% in Jamaica (2011) and showed a drop from 31.3% (2009) to 21.3% in Guyana (2014). [8] Locally, there have been few studies on breastfeeding. In 1974, a study consisting of 348 mothers from Port-of-Spain and San Fernando General Hospitals revealed that a mere 6.3% of mothers were exclusively breastfeeding at four months postpartum. [9] In 2006, data obtained from the Trinidad and Tobago Multiple Indicator Cluster Survey (MICS) revealed the prevalence of exclusive breastfeeding in Trinidad as 12.8% in children less than six (6) months. [10] Subsequently in 2011, UNICEF Trinidad and Tobago MICS displayed an increase to 21.5% of exclusively breastfed children age 0-5 months. [11] In Tobago, a survey done in 1998 with 151 mothers revealed 48.3% and 20.8 % of infants were exclusively breast-fed at two and four months respectively. [12] See Figure 2 below.

Since 2006, there has been national and international promotion of breastfeeding and its benefits, have this been translated into practice locally? Despite the apparent benefits, what are the reasons for not exclusively breastfeeding or only exclusive breastfeeding for a short period of time? What recommendations can be made to help facilitate exclusively breastfeeding and achieve international standards?

Purpose/ objective

To determine the prevalence of exclusive breast-feeding and significant associated factors influencing exclusive breastfeeding and to assess the knowledge, beliefs and practices of breast-feeding among mothers attending health centres of the North Central Regional Health Authority in Trinidad.

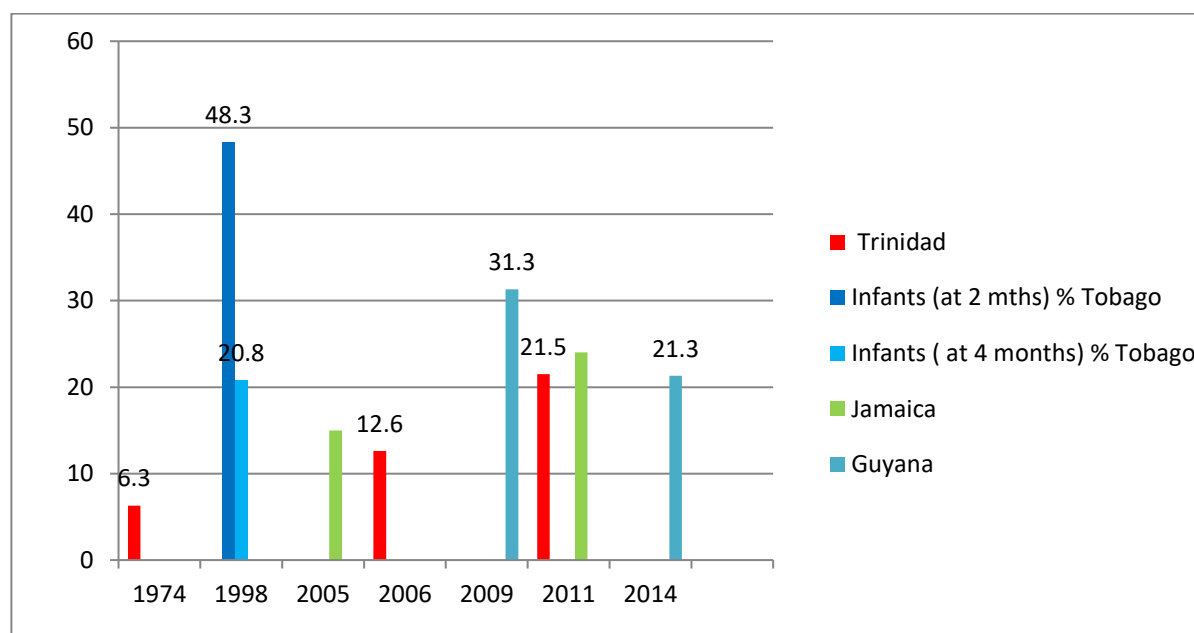


Figure 2 Percentage of exclusively breastfed infants (<6 months) in Trinidad and other Caribbean countries.

LITERATURE REVIEW

Multiple databases were searched such as Pubmed, Medcarib, Medline, Cochrane Library, Cochrane database of systematic review and Google scholar. The keywords breastfeeding, prevalence and Trinidad were searched in PubMed which yielded seven (7) results. Another search was conducted with keywords breastfeeding, prevalence and Caribbean, which yielded 135 results, however only one study, was pertinent.

Five key papers were identified with relevance to the topic, of which two studies were performed in Trinidad. Firstly *Breast-feeding practices in Trinidad* published by M Gueri, P Justum and R Hoyte in 1978. [9] Secondly in 2011, GC St. Bernard published a paper titled: *An exploratory analysis of mother's breastfeeding practices in Trinidad and Tobago: implications for children future well being*. [10] S Nichols, M Dillon-Remy, T Thomas-Murray and N Baker looked at the *Socio-demographic and health system factors in relation to exclusive breast-feeding in Tobago* in 1998.[11] Lastly, LM Chatman et al published a paper in 2004 entitled: *Influence of knowledge and attitudes on exclusive breastfeeding practice among rural Jamaican mothers*. [13]

Looking closer at the first paper, in Trinidad by Gueri et al, in the Caribbean evidence showed that the sole dependence on breast-feeding was limited to the first few weeks of a baby's life, because in the great majority of cases 'it is soon "supplemented" with artificial feeding of formula milk. " This was of particular concern in Trinidad, where the prevalence of gastroenteritis was high: in 1972, 45% of all deaths of infants one month and older were due to enteritis and other diarrhoeal diseases which could be prevented by avoiding artificial feeding." [9]

The study sample consisted of 418 women who gave birth to live infants in Trinidad's two general hospitals (at Port-of-Spain in northwestern Trinidad and San Fernando in the southwest) during a six-week period in 1974. Mothers were interviewed within 48 hrs after delivery in hospital and again after four months at their home. Demo-graphics of parents were taken and assessment of plans for feeding and attitudes towards breastfeeding were done at first interview. Feeding/ weaning practices were assessed at second visit at home after four months of delivery. Results revealed 98.3% initially planned to breastfeed but 62.6% thought bottle-feeding should begin before two months. At the second interview in four months, 348 women were interviewed with the remainder being lost to follow up. Only 6.3% of the women were exclusively breastfeeding at four months. One third of the women initiated bottle-feeding prior to two weeks of age and two fifths initiated between two weeks and two months. The main reason for artificial feeding was given as insufficient milk (35.6%), baby not satisfied (13.2%) and wanting to get baby used to the bottle (13.2%) were the second most common reasons. [9]

Strengths of this cross-sectional study were: attempting to assess the knowledge and planning for infant feeding at first interview and reasons for artificial feeding. However the former is not within the scope of my study. Important data was revealed on reasons for early artificial feeding, which are still some of the most common reasons to this date. One of the main weaknesses of this study is it did not assess breastfeeding rates at six months postpartum which is the current WHO recommendation for infant feeding. Additionally there was no assessment done on correlating factors for reasons for not exclusively breastfeeding.

The second paper published in 2011 by Bernard assessed data collected by the Trinidad and Tobago Multiple Indicator Cluster Survey (MCIS) (a national household survey) revealing the prevalence of exclusive breastfeeding in Trinidad as 12.6% in children less than six (6) months. Using secondary data analysis, “ the principal purpose of the study as to describe variable patterns of breastfeeding practices that children are exposed to during their first two years of life and hence, to advance strategies that would facilitate breastfeeding practices to achieve the World Fit for Children Goals.” [10]. “ As a result, the study strived to answer four principal questions which are as follows: What is the prevalence of breastfeeding and its variability across critical age groups in the context of children during the first 24 months of their lives? For such children, which subpopulations of children exhibit the most favourable and the least favourable breastfeeding bearing in mind international recommendations? Which children’s characteristics, if any, emerge as significant in targeting efforts towards more favourable breastfeeding standards? What are some of the main recommendations that seem to be most worthwhile?” [10]

However, based on the Trinidad and Tobago MICS 2006, 12.6% of children less than 6 months old were estimated to be exclusively breastfed and as thus, adequately fed. For infants aged 6–11 months, a higher proportion of 27.7% was estimated to be adequately fed. Regarding infants under 1 year, about one fifth (20.5%) were adequately fed. Assessments of children’s breastfeeding patterns were performed using descriptive statistics, and reported in observed variations in proportions of children who were either never breastfed, still breastfeeding or adequately breastfed (exclusively fed). Further evaluation of the variations were done and interpreted according to the gender of the children, their place of residence, social status background, mothers’ education and age cohort. Binary logistic regression models were utilized to distinguish significant attributes that could influence different breastfeeding patterns. [10]

This study consisted of significant descriptive statistics with respect to breastfeeding rates by age criterion subgroups and proportions of the fore mentioned factors. This showed that a proportion of children never being breastfed and a proportion of children being adequately fed varied favourably in relation to increases in mother’s educational status and higher socio-economic status among children.[10]

One of the weaknesses of the study is the age criterion used since it is difficult to interpret the prevalence rates of adequate (exclusive) breastfeeding at six months. The age sub groups were given as less than six (6) months, 6 to 11 months and 12-23 months. Additionally in multivariate analyses, children's age group was the only factor of the five with significant impact on probability of being still breastfed. It was suggested a larger sample size is required to assess significance of hypotheses generated from descriptive statistics such as socioeconomic status and level of education. [10]

In Tobago, a survey by Nichols et al, was conducted in 1998 with 151 mothers to determine the prevalence and significant correlates of exclusive breast-feeding among nursing mothers. 48.3% and 20.8% of infants were exclusively breast-fed at two and four months respectively. Exclusive breast-feeding at four months was significantly positively associated with mother's age, years of schooling completed by the mother, frequency of prenatal visits, mother's knowledge of the recommended duration of breast-feeding, years of schooling completed by the child's father and occupation of the child's father. In multivariate logistic analyses, with adjustment for all relevant explanatory variables, exclusive breast-feeding at two months was significantly positively associated with frequency of prenatal clinic visits, mode of breast-feeding, mother's knowledge of the recommended duration of breast-feeding and occupation of the child's father. In addition, exclusive breast-feeding at four months was significantly positively associated with frequency of prenatal clinic visits, length of hospital stay, mother's knowledge of recommended duration of breast-feeding, years of schooling completed by the child's father, family structure and inversely associated with mother's age. In this sample, there was an association with parental socio-demographic characteristics and health system factors, and infant feeding practices. [11] Numerous positive associations were found in this study however exclusive breastfeeding rates were only measured at two and four months. Paternal socio-demographic characteristics associated with breastfeeding practices have not yet been assessed in Trinidad.

Another paper titled "Breastfeeding knowledge and beliefs among adults in eastern Tobago" in 2001, was presented by Bovell-Benjamin et al. They assessed 509 adults' knowledge of duration of exclusively breastfeeding, awareness of expressing breast milk and cup-feeding a neonate, and giving water to a solely breastfed baby. Only 48% of 509 adults indicated exclusive breastfeeding for 6 months. 63% and 80% were unaware of expressed breast milk and cup-feeding a neonate. 82% believed in giving water to an exclusively breastfed baby. The main findings were: there is a lack of knowledge and benefits about breastfeeding, and factors affecting breastfeeding were maternal nutrition and employment. [13]

This cross-sectional survey aimed to assess only knowledge and beliefs, and not breastfeeding practices. The sample population was not confined to only mothers but both genders. In terms of analysis, it is purely a descriptive study, also reporting on factors affecting breastfeeding such as

inadequate maternal nutrition and employment. Therefore no associations or predictors were evaluated.

In Jamaica (2004), a cross-sectional study was conducted with 599 mothers. The objective of this study was to gather information about factors that influence exclusive breastfeeding and its duration. 22.2% of infants were exclusively breastfed (at least six months). No difference occurred between exclusive and nonexclusive breastfeeding mothers in terms of knowledge about and attitudes toward breastfeeding. The male partner's role as the main source of income for the family was the only significant predictor for exclusive breastfeeding. Women whose male partner was the main source of income for the family were twice as likely to exclusively breastfeed their infants compared with the referent group (mothers as main source of income) (OR=2.0; 95% CI=1.4-3.0). *"The dominant reason for partial breastfeeding was maternal anxiety that breast milk alone might not provide sufficient nourishment."* [14]

METHODOLOGY

Setting and population base

The study sample consisted of mothers attending Child Health Clinics in Community Health centres in the North Central Regional Health Authority in Trinidad over a six week period, January to March 2018. Seven of nine health centres were targeted; Chaguanas, Cunupia, St.Helena, Las Lomas, Arouca, Macoya and St.Joseph Health Centres, since these service the largest numbers of patients in the north central cluster. Convenience sampling was performed. Mothers attending the Child Health clinics at their third and fourth scheduled appointment were interviewed since this corresponds to the infant's third booster shot given at six (6) months of age and check up at nine (9) months of age. During the waiting period for their scheduled visit, these mothers were approached and politely asked to participate in short survey on infant feeding/ breastfeeding. Those mothers agreeing to participate in the survey were taken to a private room where confidentiality can be assured. Inclusion and exclusion criteria were applied. Eligible mothers were interviewed by a nurse (usually a District Health Visitor) or physician using a pretested questionnaire and information was gathered on place of delivery, gravidity and parity of mother, demographics of both parents such as age, ethnicity, occupation, level of education, monthly income level, marital status, living arrangements, social support, exclusivity and duration of breastfeeding, reasons for initiation of artificial feeding/ not exclusively breastfeeding, maternal knowledge and attitudes/beliefs of breastfeeding.

Non respondent/ refusal rate was also documented on the instrument along with four basic demographics of the non respondent, consisting of place of delivery, gravidity and parity of mother, age and ethnicity. There was also an inquiry into reason for refusal to participate by listed options: busy/ another appointment, uninterested and other stated reason.

Inclusion and exclusion criteria

Inclusion criteria were all mothers with six and nine month infants attending seven (7) out of nine (9) community health centres in North Central Regional Health Authority and who are nationals of Trinidad and Tobago.

Mothers who delivered twins, infants diagnosed with galactosemia, mothers who are HIV positive or has untreated active tuberculosis or infected with HTLV type 1/11, mothers with illicit drug use and those mothers on medication contraindicated in breastfeeding (such as antiretroviral medications, cancer chemotherapy agents or undergoing radiotherapy) were excluded from the study [15].

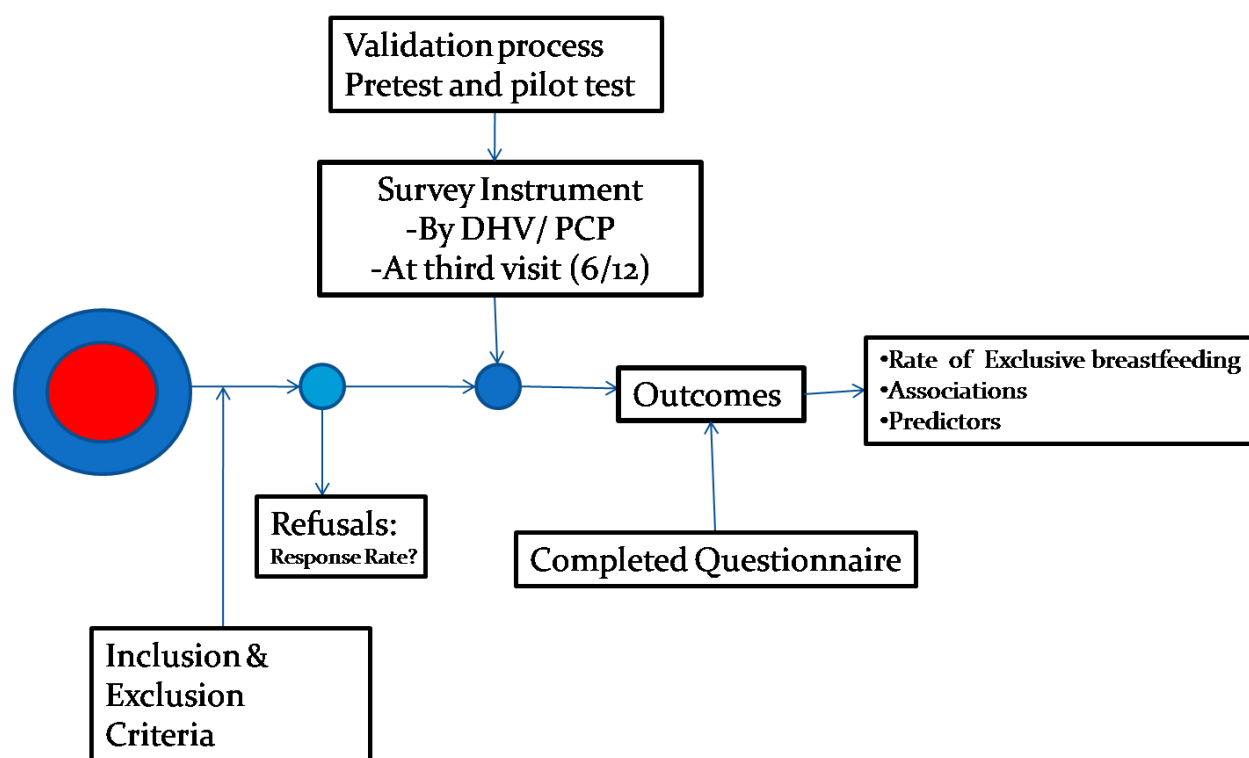


Figure 3 Flowchart of methodology

Sample size calculation

Sample size calculation for prevalence [16]: $n = \frac{z^2 P (1-P)}{d^2}$

Anticipated population proportion= 20% hence $P = 0.20$

Confidence level= 95%

Absolute precision = 5% thus $d = 0.05$

Sample size $n = \frac{1.96^2 (0.20)(0.80)}{0.05^2}$

$$= 246$$

Number of live births in central cluster for 2017 = 1735

Number of live births in north (St Joseph) cluster for 2017 = 1107

Total number of live births (N) = 2842

INSTRUMENT DESIGN AND TESTING

Development of instrument

The instrument was a pretested questionnaire consisting of information on respondents and non respondents, place of delivery, gravidity and parity of mother, demographics of both parents such as age, ethnicity, occupation, level of education, monthly income level, marital status, living arrangements, social support, exclusivity and duration of breastfeeding, reasons for initiation of artificial feeding/ not exclusively breastfeeding, maternal knowledge and attitudes/beliefs of breastfeeding. Information from two articles was used in the development of this tool. [9, 10] In addition to this, the WHO ten facts of breastfeeding and ten steps for successful breastfeeding were also utilized in the design of this questionnaire. [17, 18]

Strategies for validity of instrument

The instrument was pretested prior to formal data collection at a local health centre to assess clarity of the questions by both the interviewer and participant. See Appendix A for instrument.

Prior to pilot testing, a meeting was held with the interviewers, namely the district health visitors, nurses in screening and primary care physicians to the attached health centres. This team consisted of the interviewers in the main survey. They were informed about the concepts, definitions and instructions for administering the questionnaire. The objective of the survey and the justification of the field-testing of the questionnaire were revealed. [19] Feedback from this team on the validity, reliability and appropriateness of the questions was sought. The instrument was pretested on a small group of mothers from Cunupia Health Centre. The amount of time to complete each questionnaire was measured. After completion of the questionnaire, the respondents and the interviewers were debriefed. The information was analysed in order to clarify directions, question wording, or response categories where necessary. The necessary adjustments were performed in refinement of the instrument. [20]

Pilot testing of instrument

The sample for this pilot test consisted of 20 subjects at Cunupia Health Center. After the completion of the pilot test of the instrument, the pilot survey results were analysed and any weakness identified in the instrument, was amended in the final refinement of the survey. [19] The response obtained was coded, and analyzed. There were four open-ended questions, which were assessed using qualitative methodology leading to identification of themes and category development. These generated themes accompanied the questions in the revised tool to allow for easy data collection and analysis. Questions 23, 25 and 27 were multiple response questions. Elimination of questions not providing useful data was done, and the final adjustments were made. [20]

Analysis strategy

Analysis encompassed data entry into a statistical software program, SPSS, with resultant summation of frequencies in the respective categories and assessment of associations between exclusive breastfeeding and listed factors using Chi-squared test and binary logistic regression. Analysis of multiple response categories was also performed. Data and results were presented using tables and visual representation such as bar graphs or pie charts.

ETHICAL CONSIDERATIONS

Given the nature of the study, there are limited ethical considerations but as in all research processes, informed consent must be sought. The investigators must inform the participants in order to decide whether or not to participate in the research. Discussion with participants includes the nature of the research project, procedures of the study and procedures to maintain confidentiality, assurances that participation is voluntary and use of consent forms.

The nature of the research project involves informing the participant about the purpose of the study and how the participants are being recruited. In this project, the purpose to assess the prevalence of exclusive breastfeeding and knowledge and practices of breastfeeding with recruitment consisting of simply mothers attending the clinic at the local health centre. Since this is a straightforward questionnaire application, there are no invasive or harmful procedures posed to the participants. However it must be clearly stated that there are procedures for maintaining confidentiality such as coding of data and limiting personnel access to data. The instrument collection tool has a participant number and thus has no identifying name or address. Confidentiality may be breached if data is inadvertently disclosed, if research records are subpoenaed or if conditions are identified that must be legally reported such as child abuse or certain infectious diseases (e.g. AIDS and tuberculosis). [20]

The participants must also be given assurance that participation in the research is voluntary and thus they have the right to decline to participate and in doing so, this will not compromise their medical care.

Written consent forms are essential in documenting the process of informed consent between the investigator and participant. [21] See Appendix B for ethics consent form.

RESULTS

Demographics of population

Two hundred and forty mothers (240) were included in this cross sectional study, with 6 non-responders. See Table 1 and Figure 4 below.

Characteristics	Number (N=240)	Percent (%)
Health Centre		
Arouca	48	20
Chaguanas	113	47.1
Cunupia	10	4.2
Las Lomas	3	1.3
Macoya	37	15.4
St Joseph	15	6.3
St Helena	14	5.8
Delivery		
MHWH	196	82.4
POSGH	22	9.2
SGH	9	3.8
SFGH	1	0.4
Private Hospital	8	3.4
Home	2	0.8
Missing	2	
Parity		
1-4	215	91.1
5-8	21	8.9
Missing	4	

Table 1 Sample Characteristics: socio-demographics of mothers

One hundred and thirteen mothers (47.1%) were interviewed at Chaguanas Health centre and 20% at Arouca Health Centre. 82.4%(197) of mothers reported delivering their babies at Mt Hope Women's Hospital (MHWH) with 217 women (91.1 %) having a parity of less than 5.

The age groups 20 - 29 years and 30-39 years were similar in size, accounting for 46.9% (112) and 43.9% (105) of sample population respectively. Ethnic diversity was almost evenly distributed amongst three main groups, with 90 Indo-Trinidadians representing 37.8%, 73 Afro-Trinidadians (30.7 %) and 74 Mixed ethnicity (31.1%) of the sample.

40.5% (96) of mothers attained an education level of secondary schooling (O levels) and 33.3% (79) attained tertiary level of education, with only 6.3% (15) of mothers having completed only primary school. However in terms of occupation, the percentage of housewives, self employed and employed mothers ranged from 46.4 %(111) to 11.3% (27) to 41.8% (100). The highest percentage of 22.9% (52 mothers) fell into the monthly income level \$2501- 8000 followed by 11.9% (27) in \$1000- 2500 monthly income level.

Paternal socio-demographics also comprised of the above categories. 47.5% (113) of fathers were 30-39 years of age and 32.8% (78) were in the 20- 29 age group. Approximately one third of the sample accounted for each ethnic group: Afro-Trinidadian (32.3%), Indo-Trinidadian (33.6%) and Mixed (33.2%). 86.5 % (199) of fathers were employed, 11.7 % (27) self-employed and only 1.7% (4) were unemployed.

Like their maternal counterparts, majority of fathers completed secondary schooling (O levels) 49.8% (112 fathers). However there was a lower percentage of fathers attaining tertiary education (20.4%) but a higher percent (13.3%) completing vocational courses. More than half of the men, 102 fathers (51.3%) acquire a monthly income of \$2501-8000 followed by 35 (17.6%) earning more than \$10,000 and only 1 father (0.5%) had an income of less than \$1000. See Table 2 and Figure 5 below.

Characteristics	Number (%) N=240	
	Mothers	Fathers
Age		
< 18 yrs	1 (0.4)	1 (0.4)
18-19 yrs	9 (3.8)	1 (0.4)
20- 29 yrs	112 (46.9)	78 (32.8)
30-39 yrs	105 (43.9)	113 (47.5)
>40 yrs	12 (5.0)	45 (18.9)
Missing	1	2
Ethnicity		
Afro- Trinidadian	72 (30.4)	76 (32.3)
Indo- Trinidadian	90 (38)	79 (33.6)
Mixed	74 (31.2)	78 (33.2)
Other	1 (0.4)	2 (0.9)
Missing	3	5
Occupation		
Housewife/ unemployed	111 (46.4)	4 (1.7)
Self-employed	27 (11.3)	27 (11.7)
Employed	100 (41.8)	199 (86.5)
Student	1 (0.4)	
Missing	1	10
Education		
Primary	15 (6.3)	13 (5.8)
Post primary	17 (6.2)	9 (4.0)
Secondary O levels	96 (40.5)	112 (49.8)
Secondary A levels	25 (10.5)	15 (6.7)
Vocational	5 (2.1)	30 (13.3)
Tertiary	79 (33.3)	46 (20.4)
Missing	3	15
Income (monthly)		
No income	112 (49.3)	3 (1.5)
<1000	3 (1.3)	1 (0.5)
1000-2500	27 (11.9)	26 (13.1)
2501-8000	52 (22.9)	102 (51.3)
8001- 10000	20 (8.8)	32 (16.1)
> 10000	13 (5.7)	35 (17.6)
Missing	13	41

Table 2 Sample characteristics: Socio-demographics of mother and father

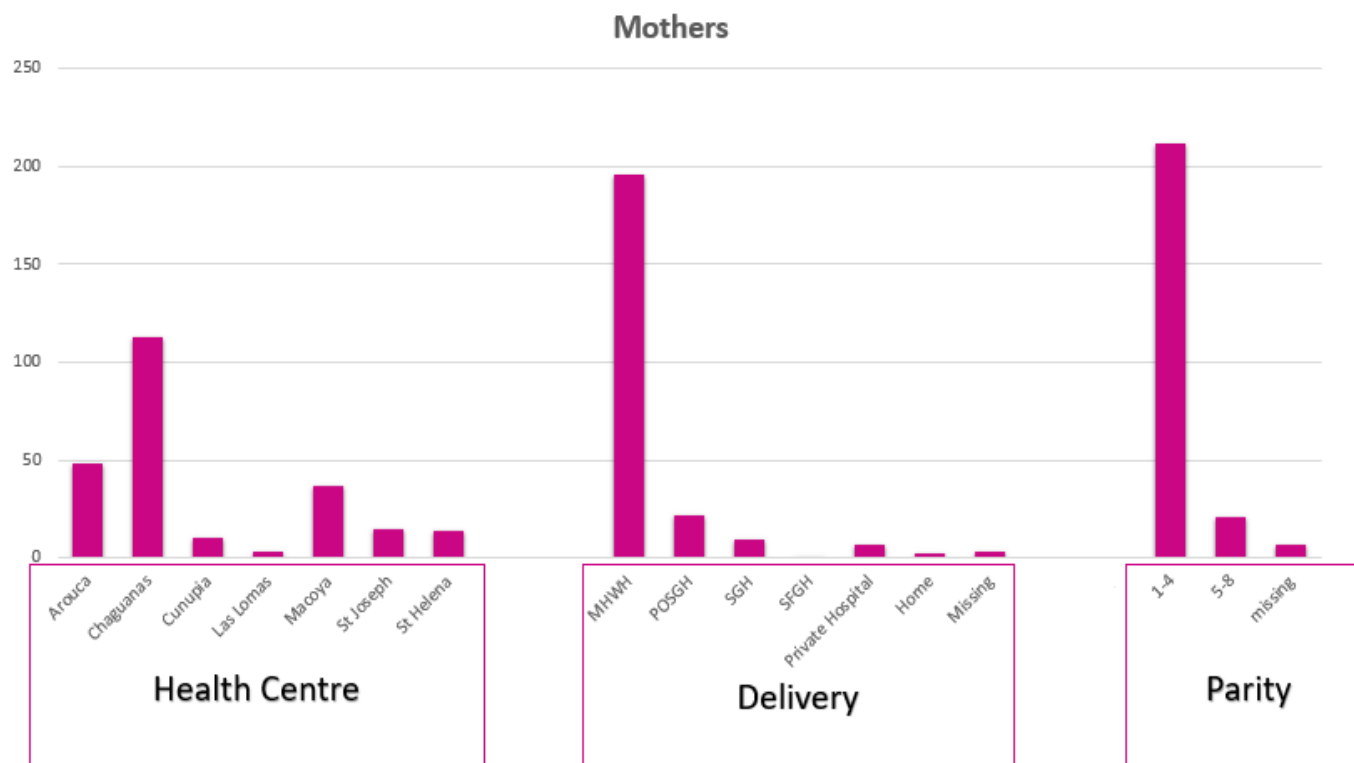


Figure 4 Socio-demographics of mother

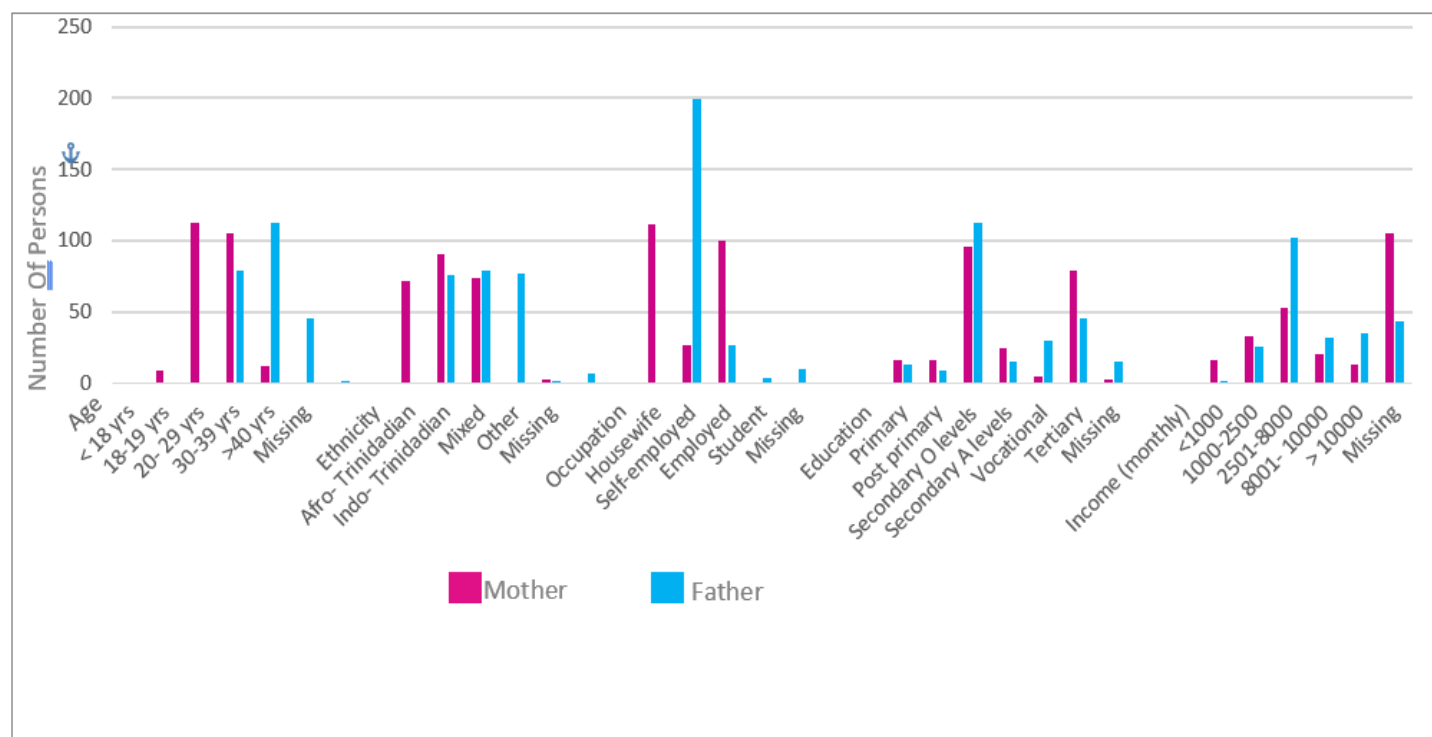


Figure 5 Socio-demographics of mother and father

Martial statuses were predominantly married (40.7%) and common-in-law relationships (45.8%). Single and separated mothers comprised collectively of 11.9%. Most families described a nuclear family structure (47.5%), extended families living with in-laws and mother's family accounted for 22.9% and 25.8% respectively. See table 3 below.

Characteristics Martial status	Number (%) (N=236)	Characteristics Living arrangements	Number (%) (N=236)
Single	20 (8.5)	Lives alone (single parent)	9 (3.8)
Separated	8 (3.4)	Extended (with in laws)	54 (22.9)
Widowed	4 (1.7)	Extended (with mother's family)	61 (25.8)
Married	96 (40.7)	Nuclear	112 (47.5)
Common-in-law	108 (45.8)	Missing	4
Missing	4		

Table 3 Socio-demographics: Martial status and living arrangements

66.3% of mothers gave positive affirmation of receiving social support from family members whilst 36.4% of mothers were getting financial support (N=240); predominantly from maternal grandmother. See table 4

Family members	Number (%)	
	Social support N= 233	Financial Support N=114
Maternal Grandmother	90 (37.7)	41 (17.2)
Maternal Grandfather	31 (13)	22 (19.3)
Paternal Grandmother	29 (12.1)	17 (14.9)
Paternal Grandfather	17 (7.1)	12 (10.5)
Maternal Aunt	31 (13)	9 (7.9)
Paternal Aunt	14 (5.9)	2 (1.8)
Other	21 (9.2)	11 (9.6)
Missing	1	1

Table 4 Family members providing social and financial support

Breastfeeding practices

Of 240 mothers who were interviewed, thirty-seven (37) infants were exclusive breastfed for 6 months, translating to a prevalence of 15.4%. Mean duration of exclusive breastfeeding (infant given only breast milk) was 2.84 months with a standard deviation of 2.26. Predominant breastfeeding for six months (water only was given in addition to breast milk) was reported by 10 mothers (4.2%).

One hundred and thirty-one (56%) of mothers were breastfeeding at this time. Infants' age ranged from 6 months to 11 months. The average duration of breastfeeding was 2.89 months with a standard deviation of 2.08. The median quoted at 3 months. Two hundred and thirty-one infants (231) were ever breastfed giving a percentage of 96.25%. Nine (9) out of two hundred and forty (240) mothers have never breastfed their infants (3.75%). See Figure 6 below.

Two hundred and three (84.6%) of mothers reported giving their babies water, formula or solids before six months. Water was given to one hundred and twenty-one (50.4%) infants before six months of age, 173 (72.1%) were given formula and complementary feeding (introduction of solids) was started early in fifty-four (22.5 %) babies less than six months of age.

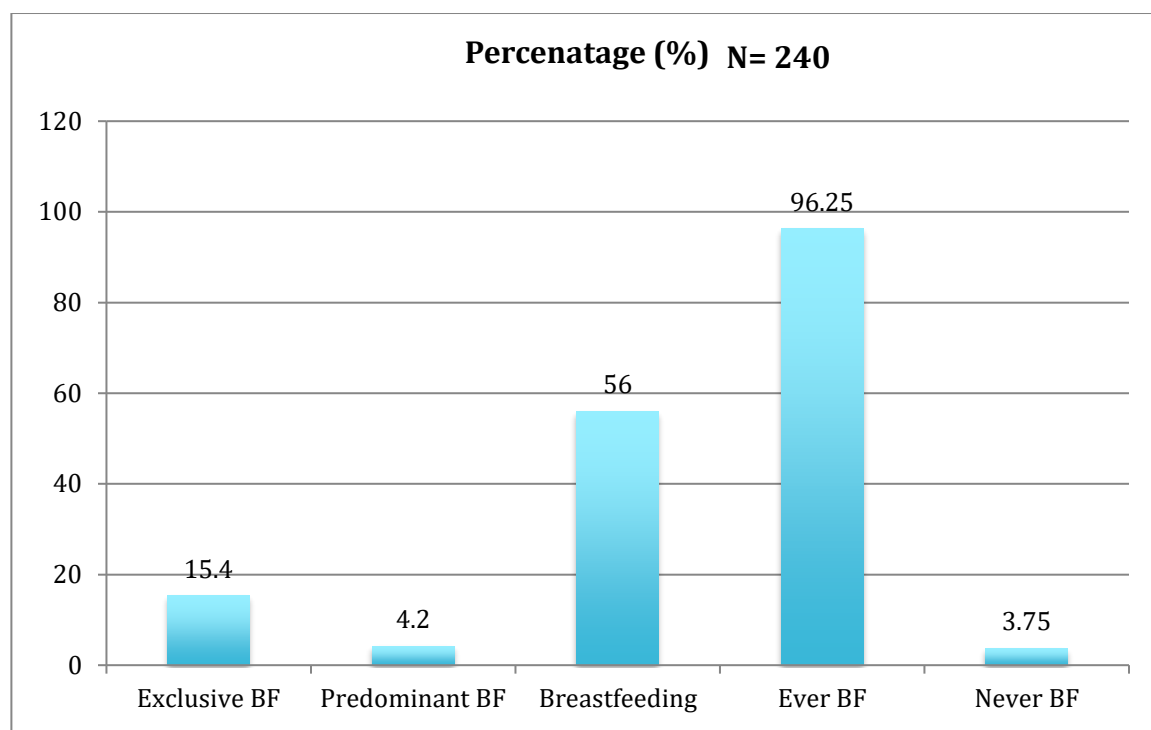


Figure 6 Prevalence of breastfeeding (BF)

The top two reasons for not exclusively breastfeeding for six months are: baby not satisfied (26.5%) and insufficient milk (20.1%). Fourteen mothers (5.8%) said planning to work and twenty-seven (11.1%) mothers reported had to work as reasons for not exclusively breastfeeding or initiation of formula feeding, giving a cumulative value of 16.9%. 10 mothers (4%) reported infants' admission to neonatal intensive care as a medical reason. See Figure 7 below.

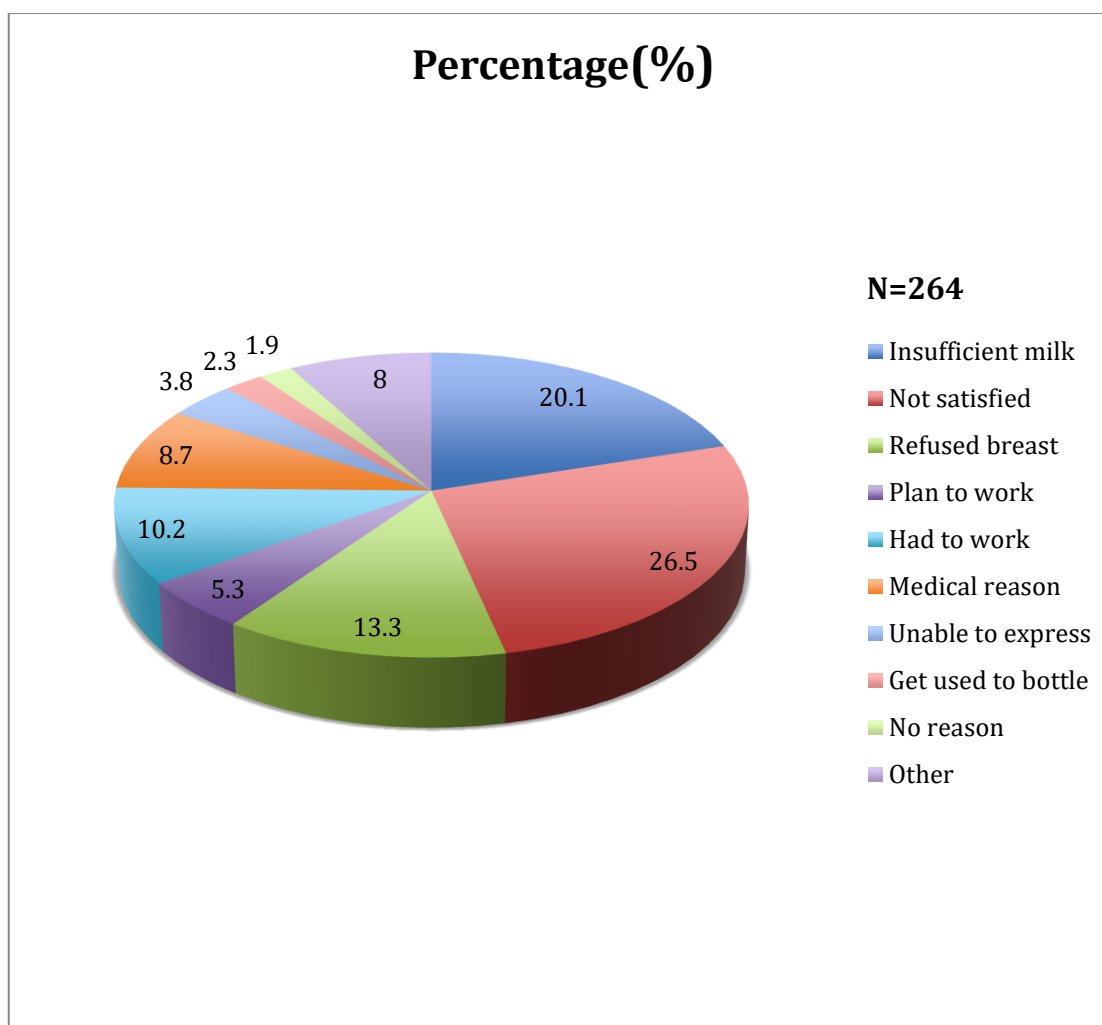


Figure 7 Reasons for not exclusively breastfeeding for six months

Knowledge about breastfeeding

One hundred and seventy-seven women (74.1%) reported that their family members/friends encouraged them or said breastfeeding was good. Forty-six women (19.2%) said relatives said nothing or they gave no comment on breastfeeding while seventeen mothers (6.7%) were discouraged by their family/friends and formula was encouraged (2.5%).

Bonding, weight loss and financial reason were cited as main benefits of breastfeeding for the mother (29.3%, 25% and 16.5%). Only 3.7% of mothers were aware of the benefit for prevention of breast and ovarian cancer. See Figure 8 below.

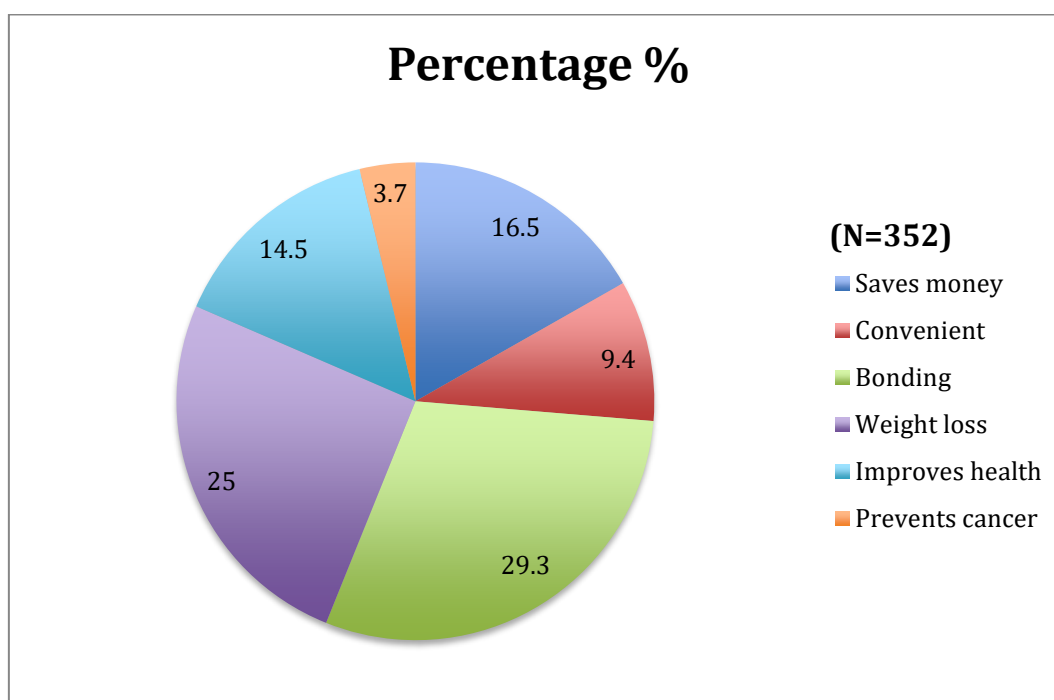


Figure 8 Maternal benefits of breastfeeding

Improving baby's general health and development was given as the main benefit of breastfeeding for the baby; one hundred and seventy-seven mothers (49.6%) gave this response. Figure 9 below.

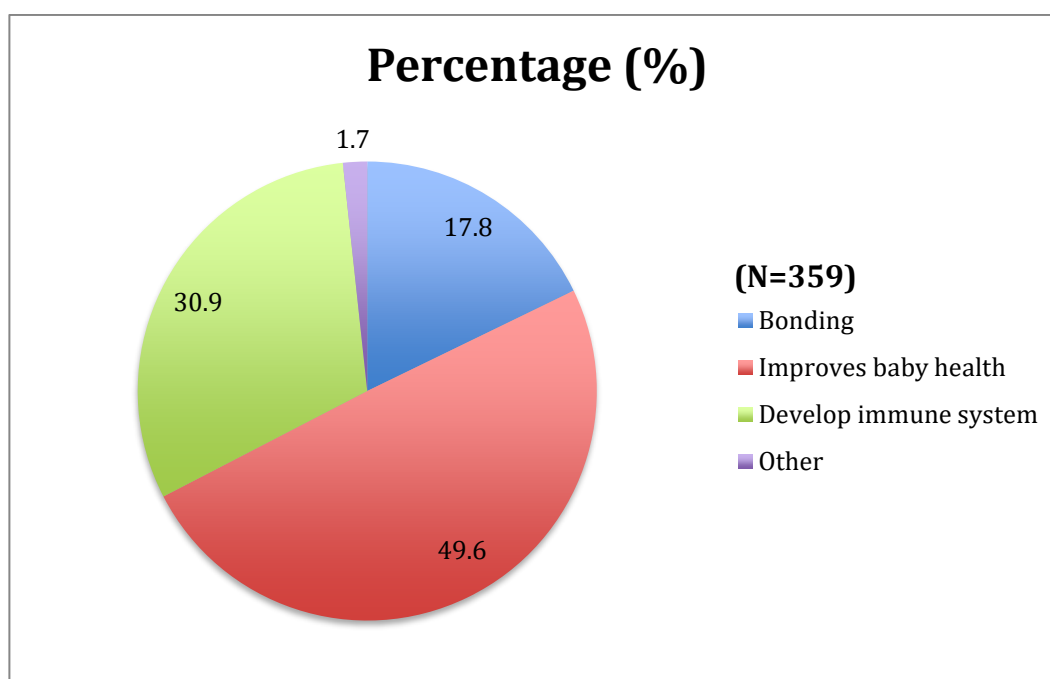


Figure 9 Benefits of breastfeeding for baby

All avenues of information were given as sources of information for breastfeeding. The health centre was the primary source of information, followed by hospital, where a tutorial is done prior to discharge. See table 5 and Figure10 below.

Source of Information	Number of responses (N= 349)	Percentage (%)
Hospital	96	27.5
Health centre	108	30.9
Family members	70	20.1
Research	75	21.5

Table 5 Sources of information regarding breastfeeding

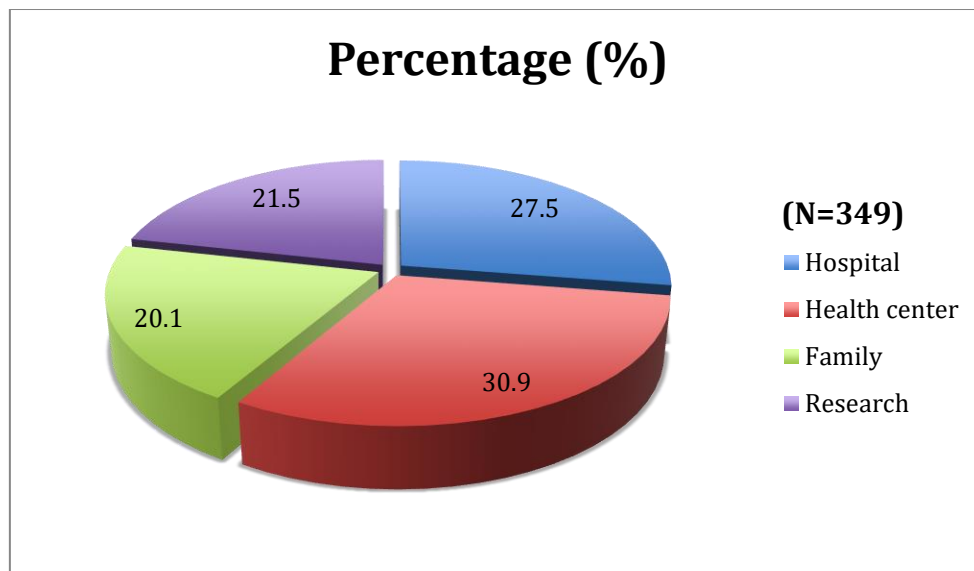


Figure 10 Sources of information regarding breastfeeding (N=349)

Five statements were asked to each participant to assess their knowledge about breastfeeding, which were adapted from WHO ten facts of breastfeeding. Most mothers strongly agree or agree with these statements indicating they are well informed. See table 6 below displaying frequencies and percentages of responses.

Statement	N	Number of responses (%)					P value
		Strongly agree	Agree	Neither agree/disagree	Disagree	Strongly disagree	
Breastfeeding is the most important step for baby in first six months	239	191 (79.9)	41 (17.2)	4 (1.7)	1 (0.4)	2 (0.8)	0.250
Baby need water in addition to breast milk	236	61 (25.8)	56 (23.7)	15 (6.4)	64 (27.1)	40 (16.9)	0.003
Breastfeeding should be started within half hour of birth	238	131 (55.0)	70 (29.4)	18 (7.6)	16 (6.7)	3 (1.3)	0.267
Breastfeeding should be encouraged on demand	239	140 (58.6)	70 (29.3)	11 (4.6)	16 (6.7)	2 (0.8)	0.173
Artificial teats/ pacifiers should be avoided	239	100 (41.8)	47 (19.7)	18 (7.5)	65 (27.2)	9 (3.8)	0.0112

Table 6 Assessment of mother's knowledge of breastfeeding.

However there were two statements with notable differences. In response to the statement, babies need water in addition to breast milk in the first six months of life; there was almost equivocal response for agreement/disagreement. 104 mothers with good knowledge of breastfeeding practices, correctly and confidently disagreed with this statement (44 %). Fifteen mothers (6.4 %) neither agree or disagree. 49.5% (117) gave affirmation on giving babies water in the first six months. This proved to a positive significant predictor of exclusive breastfeeding ($p=0.003$). Despite knowing the correct practice, some mothers continued to agree because they believed the baby needs water in addition to breast milk. A common reason stated was residing in the hot climate and belief that the baby may be thirsty.

Over a quarter of the sample population (31%) objected to avoidance of pacifier and artificial teats usage. They admitted to using a pacifier to soothe baby and voiced no problems with breastfeeding. 61.5% agreed with artificial teats/pacifiers must not be given to breastfeeding infants, as per WHO standards. See Figure 11 below.

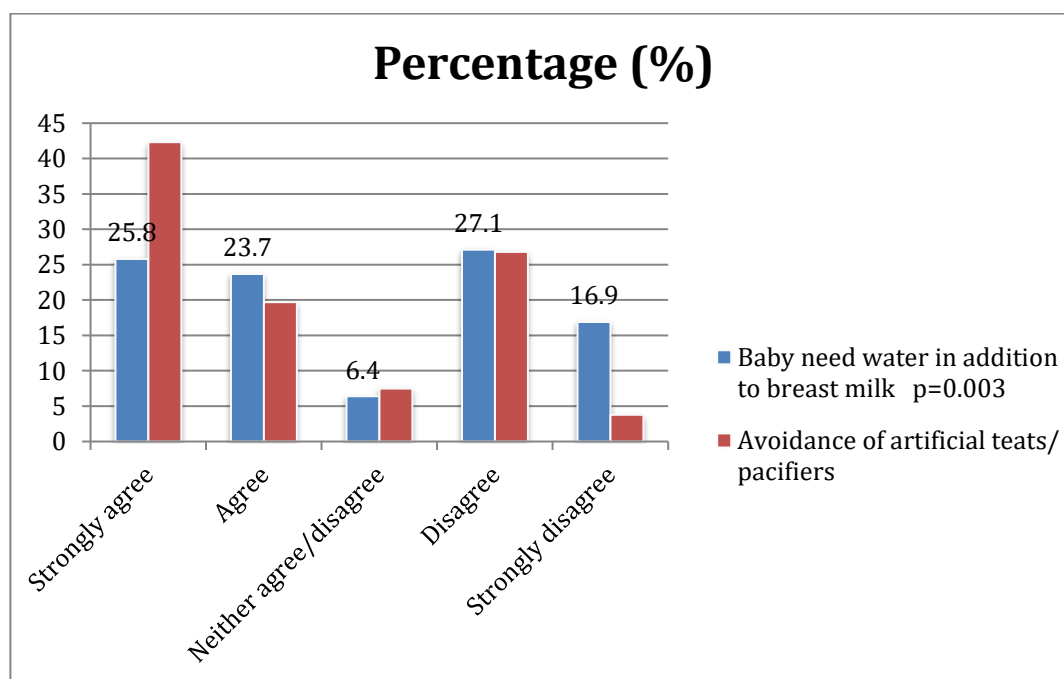


Figure 11 Statement: Babies need water in addition to breast milk in first six months of life.

Attitudes /beliefs

One hundred and ninety-three (193) of 240 mothers (80.5%) believe/agree that breast milk only in the first six months is sufficient nutrition. Nine mothers (3.8%) neither agree/disagree. Thirty-eight mothers (15.8%) disagreed with this statement.

196 mothers (82.4%) were willing to continue breastfeeding if they had to return to work or were breastfeeding still after returning to work. 31 mothers (12.6%) disagree/strongly disagree with this practice. There was a positive association with exclusive breastfeeding and mothers who agreed with this statement ($p=0.034$). See table 7 and Figure 12 below.

Attitudes/beliefs		Number of responses (%)					P value
	N	Strongly agree	Agree	Neither agree/disagree	Disagree	Strongly disagree	
Giving a baby (0-6 months) breast milk only is sufficient nutrition	240	129 (53.8)	64 (26.7)	9 (3.8)	26 (10.8)	12 (5.0)	0.146
I will continue to breastfeed after returning to work	238	137 (57.6)	59 (24.8)	11 (4.6)	22 (9.2)	9 (3.8)	0.034

Table 7 Attitudes/ beliefs of breastfeeding mothers

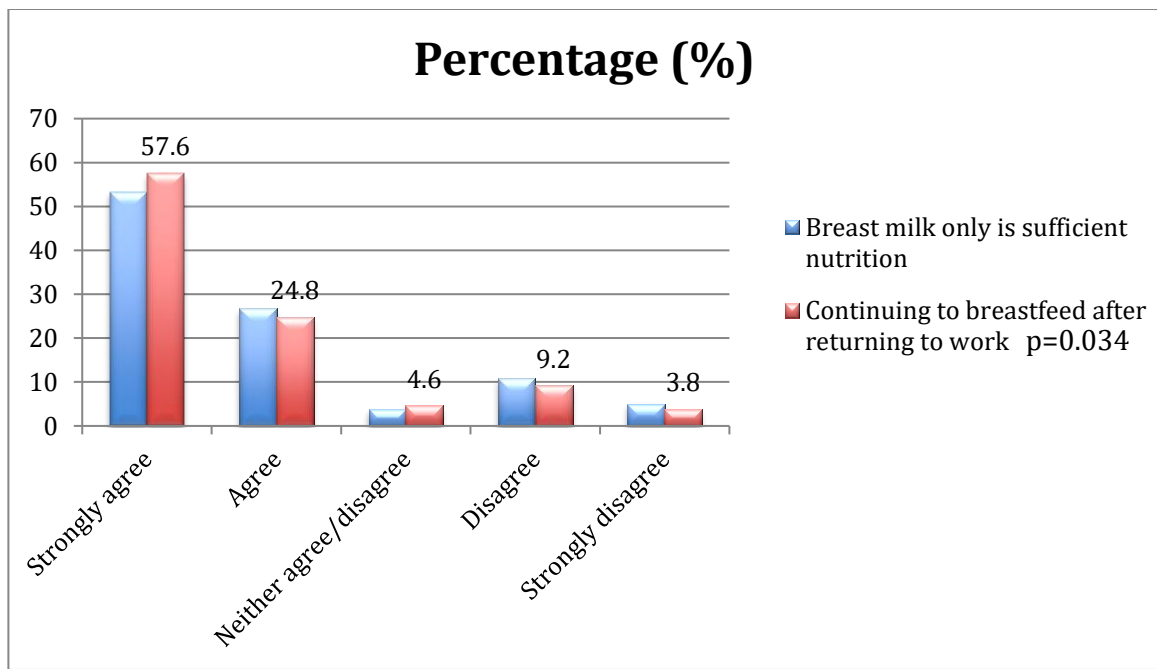


Figure 12 Positive attitudes and beliefs of breastfeeding mothers

Assessment of predictors

Using Chi squared analysis, there was no association between exclusive breastfeeding and the majority of variables. See table 8 and 9 below. However there was a significant relationship between exclusive breastfeeding and mother's monthly income ($p= 0.041$), marital status ($p= 0.000$), social support ($p= 0.001$), financial support ($p= 0.044$), encouragement by family/friends ($p=0.004$), knowledge of babies needing water in first six months ($p=0.003$) and having a positive attitude to continue to breastfeed and work ($p=0.034$). See table 10 below.

Socio-demographics: Mother	Exclusive breastfeeding number (%)	Non Exclusive breastfeeding number (%)	P value
Parity (N=238)			
1-4	32 (86.5)	185 (92)	0.274
5-8	5 (13.5)	16(8.0)	
Age (N=239)			
16- 29 yrs	17 (45.9)	104 (51.7)	0.517
30- 45 yrs	20 (54.1)	97 (48.3)	
Ethnicity (N=238)			
Afro- Trinidadian	10 (27)	63 (31.3)	0.239
Indo- Trinidadian	11(39.7)	79 (39.3)	
Mixed	16 (43.2)	59 (29.4)	
Occupation (N=239)			
Housewife/student	15 (40.5)	97 (48.0)	0.514
Self-employed	6 (16.2)	21 (10.4)	
Employed	16 (43.2)	84 (41.6)	
Education level (N=237)			
Primary/ post primary	2 (5.4)	30 (15)	0.130
Secondary O levels	13 (35.1)	83 (41.5)	
Secondary A levels/ Vocational	4 (10.8)	26 (13)	
Tertiary	18(48.6)	61 (30.5)	
Monthly income level (N=115)			
<1000 -2500	2 (10)	28 (29.5)	0.041
2501-8000	8 (40)	44 (46.3)	
> 8000	10 (50)	23 (24.2)	

Table 8 Chi² results for socio-demographics of mothers and exclusive breastfeeding.

Socio-demographics Father	Exclusive breastfeeding number (%)	Non Exclusive breastfeeding number (%)	P value
Age (N=238)			
16- 29 yrs	9 (25)	71 (35.1)	0.488
30- 39 yrs	19 (52.8)	94 (46.5)	
>40 yrs	8 (22.2)	37 (18.3)	
Ethnicity (N=235)			
Afro- Trinidadian	14 (38.9)	62 (31.2)	0.287
Indo- Trinidadian	8 (22.2)	71 (35.7)	
Mixed	14 (38.9)	66 (33.2)	
Occupation (N=230)			
Employed	30 (83.3)	169 (87.1)	0.785
Self-employed/student	5 (13.9)	22 (11.3)	
Unemployed	1 (2.8)	3 (1.5)	
Education level (N=225)			
Primary/ post primary	1 (2.9)	21 (11.1)	0.271
Secondary/ Vocational	25 (71.4)	132 (69.5)	
Tertiary	9 (25.7)	37 (19.5)	
Monthly income level (N=197)			
<1000 -2500	4 (12.5)	24 (14.5)	0.057
2501-8000	12 (37.5)	90 (54.5)	
8000- 10000	5 (15.6)	27 (16.4)	
> 10000	11 (34.4)	24 (14.5)	

Table 9 Chi squared analysis of socio-demographics of father and exclusive breastfeeding.

PREDICTOR VARIABLE	Exclusive BF	Non Exclusive BF	P value
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	number (%)	number (%)	
Martial Status			
Single/Separated/Widowed	4(11.1)	28(14)	0.000
Married	25(69.4)	71(35.5)	
Common-in-law	7(19.4)	101(50.5)	
Living arrangements			
Nuclear	20(55.6)	92(46)	0.537
Extended (with in-laws)	9(25)	45(22.5)	
Extended (with mother's family)	6(16.7)	55(27.5)	
Lives alone (single parent)	1(2.8)	8(4)	
Social support			
Yes	16(43.2)	143(70.4)	0.001
No	21(56.8)	60(29.6)	
Financial support			
Yes	9(24.3)	79(38.9)	0.044
No	28(75.7)	124(61.1)	
Advice from family/friends			
Encourages breastfeeding	22(59.5)	156(77.2)	0.004
Give no comment	8(21.6)	37(18.3)	
Discourages	7(18.9)	9(4.5)	
KNOWLEDGE			
Babies need to be given water			
Strongly agree	3(8.3)	60(30.0)	0.003
Agree	4(11.1)	51(25.5)	
Neither agree/disagree	4(11.1)	11(5.5)	
Disagree	15(41.7)	47(23.5)	
Strongly disagree	10(27.8)	31(15.5)	
ATTITUDES			
I will continue to breastfeed after returning to work			
Yes	35 (94.6)	161 (80.1)	0.034
No	2 (5.4)	40 (19.9)	

Table 10 Column percentages and p values for various predictors and exclusive breastfeeding.

The variables demonstrating a significant association with exclusive breastfeeding were then examined further using binary logistic regression to determine the extent of the association. See table 11 below highlighting odds ratios (OR) and p values.

PREDICTOR	P value	OR	95% CI lower	95% CI upper
Marital status				
Common-in-law	0.001			
Single/Separated/Widowed	0.275	2.061	0.563	7.547
Married	0.000	5.080	2.083	12.389
Income (mother) \$				
<1000-2500	0.057			
2500-8000	0.258	2.545	0.504	12.866
> 8000	0.028	6.087	1.210	30.613
Social support	0.002	3.128	1.527	6.406
Financial support	0.047	2.328	1.013	5.351
Social influence				
Encourage BF	0.008			
No comment	0.344	1.533	0.633	3.715
Discourage BF	0.002	5.515	1.866	16.304
Babies need water				
Strongly agree	0.009			
Agree	0.567	1.569	0.335	7.337
Neither	0.017	7.273	1.426	37.087
Disagree	0.005	6.383	1.745	23.352
Strongly disagree	0.007	6.452	1.654	25.164
Attitudes				
I will continue to breastfeed after returning to work	0.049	4.348	1.003	18.842

Table 11 Odds ratio (OR) and 95% confidence intervals (CI) for various categories.

Positive associations can be seen in these categories, demonstrated by $p < 0.05$ and $OR > 1$, when compared to the referent group (first). There is positive association between marital status and exclusive breastfeeding, as demonstrated by p value = 0.000 and $OR = 5.080$, 95% $CI = 2.083-12.389$. Therefore married mothers are 5 times more likely to exclusively breastfeed compared to the referent group, whose status is common-in-law.

Monthly income level of mother has a positive association with exclusive breastfeeding ($p = 0.014$). Mothers in an income bracket of $> \$8000$ compared to the lowest income level, has 4.891 odds of exclusively breastfeeding compared to non exclusively breastfeeding.

Mothers with social support ($OR 3.128$ 95% $CI 1.527- 6.406$) and financial support (2.328 , 95% $CI 1.013 -5.351$) are more likely to exclusively breastfeed as compared to non-exclusive breastfeeding. Mothers who disagree with the statement, babies need water in addition to breast milk in the first six (6) months of life, has > 6.0 odds of exclusively breastfeeding. Mothers with positive work attitudes are four times more likely to exclusively breastfeed than non exclusively breastfeed, when compared to mothers who are not willingly to work and breastfeed their infant.

DISCUSSION

Globally there has been an increase of only 7% in exclusive breastfeeding rates in the past 15 years. UNICEF global databases 2016 based on MICS, quoted 2 % increase in exclusively breastfeeding infants from 31% (2000) to 33% (2015) in Latin America and the Caribbean. See Figure 13. In this study, the prevalence of exclusive breastfeeding is 15.4 %, compared to 12.6% in 2006, this reflects a similar 2.8% increase in last 12 years. However we are below international rates.

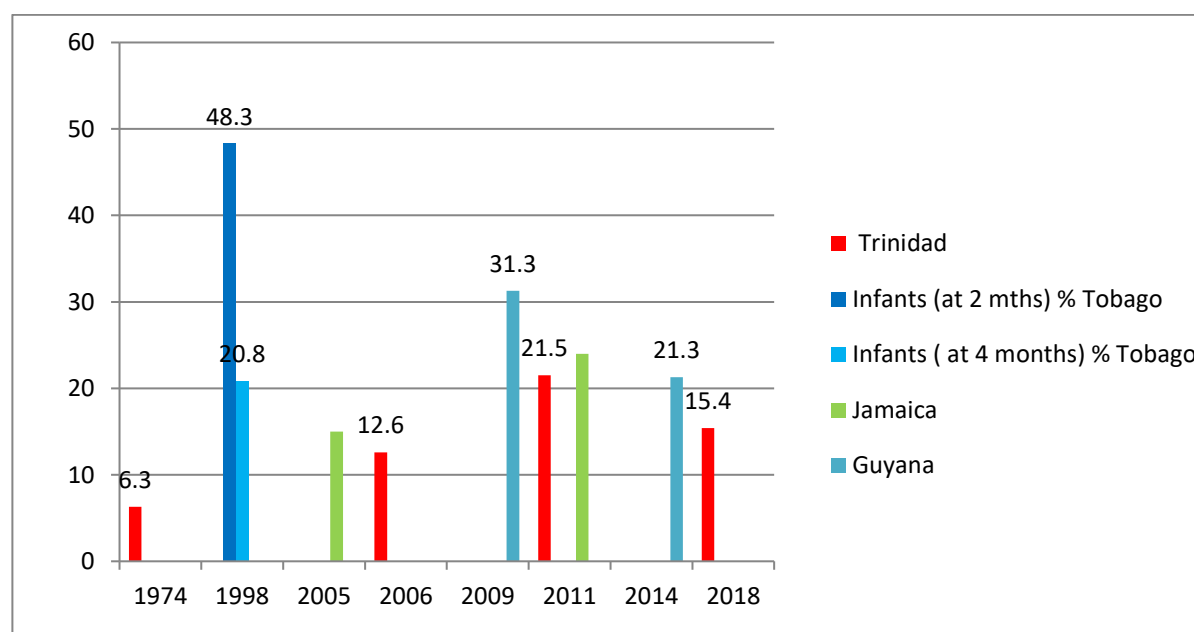


Figure 13 Percentage of exclusively breastfed infants (<6 months) in Trinidad and other Caribbean countries.

In United States of America, the percentage of exclusively breastfed infants in 2014 was 24.9%. There was an increase from 42% (2004) to 55% (2014) of infants being breastfed at 6 months. This is comparable to the 56% of infants being breastfed from age 6 – 11 months, seen in this analysis.

In Jamaica, a cross-sectional study of 599 mothers done in 2004, revealed a 22.2% of exclusively breastfed infants for at least six months. [14] Regionally, data displayed by UNICEF Multiple Indicator Cluster Survey (MICS) surveys, quoted percentages of infants who were exclusively breastfed less than six months as opposed to the definition of exclusive breastfeeding at least six months. Rates increased from 15% (2005) to 24% in Jamaica (2011) and showed a drop from 31.3% (2009) to 21.3% in Guyana (2014). [8] For Trinidad and Tobago, there was an increase from 12.8%

(2006) in children less than six (6) months to 21.5% (2011) of exclusively breastfed children age 0-5 months. [10,11] These values are not reflective of the true percentage of exclusive breastfed infants from 0 to 6 months. This study provides that true percentage of (15.4%) of exclusively breastfed infants up to six months.

Chatman et al (2004) reported male partner's role as the main source of income for the family as the only significant predictor for exclusive breastfeeding, by which mothers were twice as likely to exclusively breastfeed. (OR=2.0, 95% CI= 1.4-3.0) The main reason for not exclusive breastfeeding was reported as “maternal anxiety that breast milk was insufficient nutrition.” [14] Fourteen years later, with the promotion of the Baby-Friendly Hospital Initiative by the World Health Organisation (WHO) worldwide, the ten steps of successful breastfeeding are being instituted in hospitals to educate and support mothers. This is being reflected in this survey, as mothers are very informed: there is a high percentage of mothers who strongly agree/ agree with the six out of the seven statements and thereby knowing that breastfeeding is the most important step a mother can do for her baby and breast milk only in the first six months of life is sufficient nutrition. However the knowledge of these statements did not have a positive association with exclusive breastfeeding ($p=0.250$ and $p=0.146$ respectively).

Gueri et al (1978) interviewed 418 mothers within 48 hours of delivery and at four months. At four months, from a sample of 348 women, only 6.3% were exclusively breastfeeding. Reasons for initiation of artificial feeding were insufficient milk (35.6%), baby not satisfied (13.2%) and wanting to get baby used to the bottle (13.2%). [9] These reasons are still cited as reasons for not exclusively breastfeeding in 2018: baby not satisfied (25.5%), insufficient milk (20.1%), work related reasons- planning to work or had to go to work (15. 5%) as well as baby refused the breast (13.3%). A small percentage of mothers (3.8%) said they were unable to express milk. Insufficient milk and return to work have also been identified as the most common reasons for not exclusively breastfeeding in other international studies. This highlights the need for professional lactation support services such as lactation consultants, to optimize lactation in nursing mothers. There are numerous variables impacting breast milk supply and production; from mother's nutrition, hydration status, emotional and physical stressors to proper latching technique and infants' ability to suckle on the breast. Lactation specialists are trained to assist mothers in overcoming these difficulties.

Breastfeeding knowledge and beliefs among adults were assessed in Eastern Tobago in 2001. Only 48% of 509 adults indicated the mother should exclusively breastfeed for 6 months. 82% believed in

giving water to an exclusively breastfed baby. Main findings were: there is a lack of knowledge and benefits about breastfeeding, and factors affecting breastfeeding were maternal nutrition and employment. [13]

This is a common cultural belief; babies need to be given water, even if exclusively breastfeeding. 49.5% of mother strongly agree/agree with this statement, 6.4% neither agree/disagree, whilst 44.0% of mothers opposed it. 4 % (10) of mothers predominantly breastfed their infants; only breast milk and water (usually introduced at four months) were given and no artificial feeding was initiated. In spite of knowing that water is not needed for an exclusively breastfed infant, some mothers still agreed with this practice. Knowledge about this statement has a significant positive correlation to exclusive breastfeeding ($p=0.005$, OR= 6.383, 95% CI 1.745-23.352). Mothers who disagree with this statement are six times more likely to exclusive breastfed as compared to non exclusively breastfeeding, with the referent being in agreement. See table 8. A common reason stated for giving water, was residing in the hot climate and belief that the baby may be thirsty. Water is viewed as being good for the baby, aiding in hydration and bowel movements. Cultural beliefs can be difficult to dissuade especially if being advised/ reinforced by family members or peers. This can be achieved by continuing to educate mothers and by extent the population, on proper breastfeeding practices.

In 2011, Bernard did “ An exploratory analysis of mother’s breastfeeding practices in Trinidad and Tobago”, which was based on UNICEF Trinidad and Tobago MICS 2006. His analysis of 424 infants less than 2 years, demonstrated that there is an estimated proportion of 11.6% of children never breastfed, 88.4% ever breastfed, 45.8% still breastfeeding and 21.2% adequately breastfed. There was a positive association between proportion of never breastfed and adequately breastfed infants, and higher education and socio-economic status of the mothers. This is reversed for still breastfeeding children. On further analysis using binary logistic regression, only children’s age group was significant to increase the likelihood of still breastfeeding. No significant factors were found for adequately breastfed infants possibly due to small sample size. He concluded that there was a lack of knowledge of international standards for breastfeeding practices in Trinidad and Tobago, which is being reflected in the results. [10]

It is demonstrated that a higher proportions of infants are being breastfed- exclusively (15.4%), ever breastfed (53.8%) with a lower percentage of infants never breastfed (3.8%). It is now clear that the mothers of Trinidad and Tobago are knowledgeable of WHO recommendations of breastfeeding practices and its benefits. The majority of mothers strongly agreed/agreed with all statements except

one; baby needing water in addition to breast milk in the first six months of life. See table 5.

Knowledge about artificial teats/pacifiers displayed a mixed picture; 61.5 % of mothers strongly agree/agree with avoidance of artificial teats/pacifiers but 31% of mothers disagreed. They admitted to using a pacifier to soothe baby and cited no problems with breastfeeding. It is especially important that these be avoided during the early weeks so baby's suckling can be satisfied by the breast and aids in adjustment of breast milk supply. [1] If baby is unable to breastfeed, cup feeding should be done till breastfeeding is established. 13.3% (35) mothers vocalized baby refused the breast. There are multiple scenarios which lead to refusal: initially there was insufficient milk, baby is not satisfied and then refusal of breast. Some reported it occurred shortly after returning from hospital if baby or mother was hospitalized (4 out of 35 mothers). 24 out of the 35 mothers reported baby refused the breast with no indicating reason. Many mothers were disappointed in not being able to breastfeed their infant for a longer duration of time especially those with previous offspring who were adequately breastfed.

Mothers were generally knowledgeable about the benefits of breastfeeding but more confident in their responses for benefits for baby than themselves. 80.4% of mothers cited breastfeeding is beneficial to baby's overall health and development, with only 18.2% of mothers aware of or remembered the positive benefits to their own health including prevention of breast and ovarian cancer. 25 % of mothers reported the benefit of weight loss with breastfeeding but bonding with baby (29.6%) scored the highest value.

Information is being disseminated at multiple sources: in health centres (during prenatal visits, in child health clinics), at hospital (following delivery, prior to discharge), from family members and through research (books/ internet). All four modalities were similar in percentage; health centre (30.8%) and hospital (28.2%) were indicated as the main sources. Health centre and place of delivery failed to demonstrate any increased likelihood of exclusively breastfeeding. This solidifies that WHO and UNICEF Baby-Friendly Hospital Initiative (BFHI), is being implemented in Trinidad and it is successfully educating mothers and assisting with lactation.

This may explain why the mother's education level is no longer a significant associating factor for breastfeeding since there is general increase in the level of education (a mere 6.8% of mothers completed primary school) and the knowledge imparted by health care educators is effectively reaching mothers of all educational and socio-economic statuses.

With respect to attitudes towards breastfeeding, 196 mothers (82.4%) affirm their commitment to continue breastfeeding and working and this positively correlates to exclusive breastfeeding ($p=0.049$, $OR=4.348$, $95\%CI=1.003-18.842$). There still remains a positive association between exclusive breastfeeding and higher socio-economic status of the mother ($p=0.041$). Using binary logistic regression, mothers having a monthly income level of more than \$8000 have higher odds of nearly six times more likely to exclusively breastfeed as compared to non exclusively breastfeeding. ($OR=6.087$, $95\%CI=1.210-30.613$). Possible explanations are mothers are able to purchase better breast pumps (electric) and accessories needed to express and store breast milk, thus allowing them to exclusively breastfeed despite working. Higher income workers translate into having a better working environment, which may have an appropriate space and allows frequent breaks on the job for expressing milk. These mothers may also take longer periods of leave from work post partum such as maternity and vacation leave, in order to maximize time at home with baby to exclusively breastfeed. It can also be hypothesized better availability to resources such as Internet for research and access to professional breastfeeding support services.

Nichols et al (1998) conducted research in the twin island of Tobago, highlighting the prevalence of exclusive breastfeeding and various significant variables at two and four months (not 6 months). At four months, significant positive predictors were frequency of prenatal clinic visits, length of hospital stay, mother's knowledge of recommended duration of breast-feeding, years of schooling completed by the child's father, family structure and inversely associated with mother's age. [12] Chatman et al also reported the male partner's income as a significant predictor. [14] This study also examined paternal socio-demographic characteristics and its impact on exclusive breastfeeding. As compared to the above, age of mother, living arrangements/ family structure, completed level of education by the father [12] and father's income level [14], were not significant predictors in this study.

Additionally, parity, health centre, place of delivery, ethnicity of mother and father, occupation of mother and father, mother's education level and age of the father were not significant predictors.

However marital status had a strong positive association with exclusive breastfeeding ($p=0.000$). It is apparent that the paternal presence plays an important role in exclusive breastfeeding. Married mothers are 5 times more likely to exclusively breastfeed compared to those in a common-in-law relationship. Married and common-in-law relationships are both committed relationships but what makes them distinguishing in this case? It can be postulated that the nursing mother perceives a greater depth/level of the commitment of the father to mother and infant in the sanctity of marriage, as opposed to a

common-in law relationship, especially in the case of newly weds. Other possible explanations for married partners, could be the paternal support in the decision to breastfeed exclusively, greater level of paternal involvement in caring for the infant as well as caring for the mother's well being. Mother's well-being is linked to maintaining adequate breast milk supply: adequate nutrition, hydration, sleep, anxiety and stress can impact on her breast milk production. The married father thereby provides social and emotional support as well as financial security. This study did not assess religion as a predictor but religion promotes marriage and even breastfeeding. Certain religions such as Islam are stringent on marriage and childbearing, and actually instruct mothers to breastfeed for at least two years.

Social and financial supports are significant associating factors for exclusively breastfeeding. 66.3% of mothers with social support (OR=3.128, 95% CI=1.527- 6.406) are three times more likely to breastfeed exclusively compared to non-exclusively breastfeeding. Mothers (36.3%) having financial support (OR=2.328, 95%CI=1.013 -5.351) are twice as likely to exclusively breastfeed. Maternal grandmother is the main contributor in both aspects. Unless the mother is able to express milk regularly, maintaining exclusive breastfeeding can be time consuming and makes it difficult if the nursing mother has other young children to care for simultaneously. The social and emotional support by family members lightens the task of the nursing mother and also facilitates caring for her well-being. Financial support aids in financial security: the mother may not feel burdened to return to work or work longer hours to support her family, thereby maintaining that close connection to her infant.

Looking at social influence, in terms of what family/ friends tell the mother about breastfeeding, 177 women (74.1%) reported that their family members/friends encouraged them or said breastfeeding was good and 17 (6.7%) were discouraged by their family/friends. Discouragement comes in two forms: discouraging mother from breastfeeding and secondly discouraging the mother from exclusively breastfeeding by promoting the initiation of artificial feeding/formula, with the latter being more popular. Descriptively, there is positive support by family and friends yet on looking for a positive correlation using binary logistic regression, discouraging advice was the significant predictor ($p=0.004$), having an OR= 5.515, 95% CI= 1.866-16.304. Mothers who are discouraged from breastfeeding are 5.515 times more likely to breastfeed exclusively with the referent group being positive social influence: encourages breastfeeding. This is unexpected and it can be hypothesized that even though they receive discouraging advice, these mothers are well informed and strong in their commitment to exclusively breastfeed.

Impact of the study

There is an increase in percentage of infants who are exclusively breastfed to 15.4%, who are breastfeeding 56%, ever breastfed 96.25% and a decrease in the percentage of infants who are never breastfed 3.75%. The predominant reasons for not exclusively breastfeeding are insufficient milk and baby not satisfied. In assessment of knowledge, attitudes and benefits, mothers are overall well informed and displayed positive attitudes to breastfeeding. Cultural beliefs can hamper proper breastfeeding practices.

Paternal socio-demographics and its influence on breastfeeding have not been assessed in Trinidad till this date. Whilst there is no association with paternal age, ethnicity, completed education level, occupation and income level, marital status is a positive significant predictor for exclusive breastfeeding. This highlights the paternal role in exclusive breastfeeding. Other significant associated factors are mother's monthly income, social and financial support, social influence by family and friends, knowledge of babies needing water in first six months and a positive attitude towards work and the continuation of breastfeeding.

Limitations and challenges

One of the challenges of this study was data collection by medical staff. Due to large child health clinics or child health clinic coupled with walk in clinics, it was difficult for mainly district health nurses and primary care physicians to administer the instrument due to the large patient load, time constraint and sometimes, limited staff amongst nurses. Some primary care physicians were simply not willing to participate in data collection. Auxiliary staff was generally very helpful in the process.

An unforeseen limitation was, instead of the nursing mother, other family members such as grandmothers or fathers would bring infants to child health clinic. Some mothers also opted not to answer certain questions such as income level for themselves and the father. Few mothers were also not sure of father's completed education level or income level.

Religion was not evaluated and thus not assessed as a possible influencing factor. More direct questions regarding paternal involvement would have given a better insight to the paternal role and its possible impact on exclusive breastfeeding.

This KAP was derived from the Ten steps of successful breastfeeding by WHO. Closed questions were mainly utilized with the Likert scale to assess knowledge and attitudes. Unfortunately there is no international/ acceptable standard of scoring to summate these answers to give an accurate assessment on how knowledgeable the mothers are on this topic.

Recommendations

The most common reasons for not exclusively breastfeeding are baby is not satisfied or insufficient milk. Despite the promotion of breastfeeding by Breastfeeding Association of Trinidad and Tobago, many mothers are unaware of their support services. In first world countries, there are help lines via telephone and facilities to contact a lactation specialist and have a consultation. Increasing awareness of a lactation specialist service as well as easy accessibility, will aid mothers in breastfeeding exclusively. There is limited support/service in the primary care level of public sector (local health centres). Currently Breastfeeding Association of Trinidad and Tobago has only three offices in the northwest corridor, limiting accessibility but they are also available via social media. Whilst District Health Nurses promote breastfeeding, there is no avenue for consultation when in need/ on demand. The assignment of a lactation consultant/ professional breastfeeding specialist dedicated to the health centres or to a particular area will achieve this goal. It is recommended to assign one lactation consultant per 1,000 live births in a defined area.

Work- related issues also hamper the ultimate goal of exclusively breastfeeding. The work place should have designated areas and allotted breaks for mothers to express and store breast milk, it is lacking in most work environments. Employers and co workers should also be sensitized on the benefits of breastfeeding and importance of expressing milk. This will foster a more stress free environment and diminish hostility/ prejudice to the breastfeeding mother, who requires frequent breaks on the job.

The gold standard of maternity leave should be at least six (6) months to facilitate mother and infant rooming-in thus allowing ample time to exclusively breastfeed. Currently in Trinidad and Tobago, maternity leave is fourteen (14) weeks, which is 3 ½ months. This can account for mean duration of exclusive breastfeeding being 2.84 months.

In further studies, religion should be looked at as a possible predictor as well as the inclusion of more specific questions geared to the assessment of the paternal role/ involvement in breastfeeding.

Knowledge of breastfeeding practices should continue to strengthen its promotion in the primary care level but there should also be a drive to promote this information nationally in order to educate the general population. This may aid in strengthening social support, paternal awareness and involvement, and aid to dispel certain cultural misconceptions.

CONCLUSION

Breastfeeding rates are on the rise slowly, which is reflected in all categories such as exclusive breastfeeding, still breastfeeding, ever breastfed and a decrease in the percentage of never breastfed infants. Assignment of lactation consultants/ availability of professional breastfeeding support services at the primary care level will assist in increasing national breastfeeding rates. The implementation of WHO Baby-Friendly Health Initiative (BFHI) is being translated into positive outcomes such as increasing mother's knowledge and awareness of breastfeeding, and positive attitudes towards breastfeeding. The paternal role impacts on breastfeeding and a more elaborate analysis should be done in future studies. The children are the future of our nation; we should invest in their health and well-being.

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APPENDIX A: INSTRUMENT

KAP on exclusive breastfeeding in health centres in NCRHA, Trinidad

14. Marital Status: Single ☐ Separated ☐ Widowed ☐ Married ☐ Common-in-law/ Visiting ☐

15. Living arrangements: Nuclear (with partner) ☐ Extended (with in laws) ☐
Extended (with your family) ☐ Lives alone (Single parent) ☐

16. Social support from family members: Yes ☐ No ☐ If yes, please identify person/s _____
(e.g. does anyone help you with baby or your household duties so you can breastfeed? For example maternal grandmother)

17. Financial support from family members: Yes ☐ No ☐ If yes, please identify person/s _____

Breastfeeding Practices

18. How old is your baby? _____ months

19. Are you presently/did you solely/ exclusively breastfeeding your baby? Yes ☐ No ☐
(Defined as no other food or drink, not even water, except breast milk for at least 4 and if possible 6 months of life, but allows the infant to receive drops and syrups (vitamins, minerals and medicine)

20. Are you breastfeeding your baby? Yes ☐ No ☐ If no, when did you stop? _____ mths

21. Did you give your baby anything (water, formula milk, solids) with breast milk during the first six months?
Yes ☐ No ☐ If yes, state what was given _____

22. How long was the baby breastfed only or fed only breast milk? _____

23. Reasons for not exclusively breastfeeding for six (6) months: *Tick as many as applicable*

1. Insufficient milk ☐
2. Baby not satisfied ☐
3. Baby refused breast ☐
4. Planning to go back to work ☐
5. Had to go to work ☐
6. Medical reasons ☐ If so, please state _____
7. Unable to express milk ☐
8. Wanted baby to get used to bottle ☐
9. No reason ☐
10. Other, please state _____

Knowledge about breastfeeding

24. Breastfeeding is the most important step that a mother can do for her baby in first six months of life.
Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

25. What are benefits of breastfeeding?

For mother: Saves money/financial reason ☐ Easy/Convenient ☐ Bonding with baby ☐
 Weight loss ☐ Improves mother's health ☐ Prevents Cancer (Breast/Ovarian) ☐
 Other _____

For baby: Bonding ☐ Improves baby's health ☐ Helps develop immune system ☐
 Other _____

26. What do your friends /family tell you about breastfeeding?

Good for baby/Encourages breast feeding ☐ Nothing/No comment ☐
 Discourages ☐ State reason _____

27. Where did you get your information about breastfeeding?

Hospital ☐ Health Centre ☐ family members ☐ Research/Internet ☐

28. Babies need to be given water in addition to breast milk in the first six (6) months of life.

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

29. Breastfeeding should be started within half an hour of birth.

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

30. Breastfeeding is encouraged on demand (-as often newborn to six month old baby wants).

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

31. Artificial teats/ pacifiers must NOT be given to breastfeeding infants.

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

Attitudes/beliefs

32. Giving a baby (newborn to 6 months) breast milk ONLY is sufficient nutrition.

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

33. I will continue to breastfeed after returning to work.

Strongly Agree ☐ Agree ☐ Neither agree/disagree ☐ Disagree ☐ Strongly disagree ☐

APPENDIX B



THE UNIVERSITY OF THE WEST INDIES
 ST. AUGUSTINE, TRINIDAD AND TOBAGO, WEST INDIES
CAMPUS ETHICS COMMITTEE
CONSENT TO PARTICIPATE IN RESEARCH
 Phone: 645-3232 Ext: 5021 Email: campusethics@sta.uwi.edu

Complete Protocol Title	Exclusive breast-feeding among nursing mothers at health centers in North Central Regional Health Authority, Trinidad and its associated factors; a cross-sectional study.
Principal Investigator	Dr Rohan Maharaj
Co-Investigators	Dr Nadia N Rampersad
Research Site(s)	Health Offices at NCRHA, Trinidad
Sponsors	Not applicable

Why is this research being done?

To determine the prevalence of and significant associating factors influencing exclusive breastfeeding. It is also being conducted to assess the knowledge, beliefs and practices of breast-feeding among nursing mothers.

What is the duration of taking part in the study (for each subject)?

Duration depends on the length of time to complete the questionnaire, approx. 20 mins or less.

What will happen to me?

You will be interviewed/questioned by the district health visitor or physician.

What is in in for me?

Knowledge of exclusive breastfeeding and its benefits for mother and infant. Depending on the results, the information gathered will be useful in creating or changing policies e.g. duration of maternity leave or facilities at work place to promote breastfeeding practices

What will happen if I drop out of the study early?

There are no consequences to dropping out early.

What are my responsibilities if I join and what about confidentiality?

If you join, you will be required to fill out the questionnaire. Your name/ identity will not be disclosed to anyone. The questionnaire will be coded to protect your identity and personal information.

What if I get hurt in the study?

This is unlikely since it is simply a questionnaire.

CONSENT

I have read and understood this explanation. The researcher has also explained the study to me. I have had a chance to ask questions and have them answered to my satisfaction. I agree to take part in this study. I have not been forced or made to feel like I had to take part.

I have read the attached experimental Subject's Rights, which contain some important information about research studies. I have also read the Authorisation to use my Private Health Information. **I must sign this Consent Form, the Experimental Subject's Rights and the Authorisation to use my Private Health Information. I will be given a signed copy of each to keep.**

Print Name of Subject

Signature of Subject

Date

Signature of Person conducting the informed consent discussion

Date

Role of person named above in the research project

Signature of Second Witness

Date

**This document was approved by
Campus Ethics Committee on:**

By Chairman:

December 11 2017

S. Arforn

This document expires on:

December 10 2018



EXPERIMENTAL SUBJECT'S RIGHTS

If I am asked to consent to participate as a subject in a research study involving a medical experiment, or if I am asked to consent for someone else, I have the right to:

1. Learn the nature and purpose of the experiment (also called "study" or "clinical trial").
2. Receive an explanation of the procedures to be followed in the study, and any drug or device used.
3. Receive a description of any discomforts and risks that I could experience from the study.
4. Receive an explanation of any benefits I might expect from the study.
5. Learn about the risks and benefits of any other available procedures, drugs or devices that might be helpful to me.
6. Learn what medical treatment will be made available to me if I should be injured as a result of this study.
7. Ask any questions about the study or the procedures involved.
8. Quit the study at any time, and my decision will not be used as an excuse to withhold necessary medical treatment.
9. Receive a copy of the signed and dated consent form.
10. Decide to consent or not to consent to a study without feeling forced or obligated.

If I have questions about a research study, I can call the contact person listed on the consent form. If I have concerns about the research staff, or need more information about my rights as a subject, I can contact the Principal Investigator, The University of the West Indies at:

By signing this document, I agree that I have read and received a copy of this document.

Signature of Subject or Legal Representative

Date

REQUEST FOR PERMISSION TO USE AN INDIVIDUAL'S PRIVATE HEALTH INFORMATION

Name of Study:

Exclusive breast-feeding among nursing mothers at health centers in North Central Regional Health Authority, Trinidad and its associated factors: a cross-sectional study.

Investigators:

Dr Rohan Maharaj, Dr Nadia N Rampersad

What is private health information?

Private health information is any information that can be traced back to you. We need your permission to use your private health information in this research study. The type of private health information that will be used and shared for this study includes:

- Your past and present physical and mental health information
- Information that can be used to contact you
- Results of your medical tests and DNA
- Questionnaires and information on your drug/alcohol usage and that of your family.

Who else will see my information?

The interviewers and investigators will see your information but it will be coded to protect your identity

How long will the investigators use and share my information?

For less than one year (till July 2018)

What if I change my mind about sharing my research information?

There is no consequence if you change your mind

Do I have the right to see and copy my research information?

yes

If you agree to share your information, you should sign this form below. You will receive a copy of this form.

.....

I agree to share my information as described in this form**Print Name****Signature****Date**

If you have questions or concerns about your privacy and the use of your personal medical information, please contact the investigator at the telephone number listed in the consent form.