It's about time: An examination of breastfeeding and women's time use in Kenya

The World Health Organization has recently extended the recommended duration of exclusive breastfeeding from four to six months. To promote infant health, and reduce disease transmission from water-born illnesses, the WHO and UNICEF have issued four basic guidelines for breastfeeding in the developing world. The organization recommends: (1) the initiation of breastfeeding within the first hour after birth; (2) the exclusive breastfeeding of infants on demand for six months; (3) continuation of supplemental breastfeeding for two years and beyond; and (4) avoiding bottles, teats and pacifiers which may contribute to nipple confusion resulting in infants' reduced ability to nurse (WHO Nutrition Topics: Exclusive Breastfeeding). While the health benefits (to both mother and child) of these recommendations are supported by research, the organizations neglect the high costs of extended breastfeeding assumed by women. Development organizations are working towards women's empowerment, not only through increased educational and employment opportunities, but within families by promoting the equitable treatment of women, increased autonomy, and a more balanced distribution of household income. Yet the breastfeeding recommendations made by NGOs lay claim to women's time (and women's bodies), promoting infant health at the expense of women's empowerment. High time demands associated with exclusive and extended breastfeeding may lead to an untenable situation for women both at work and in the home. In order to meet the high time demands of exclusive and on demand breastfeeding, women in secondary or tertiary education or employed outside the home may have to leave work, or forego educational opportunities; while women in traditional roles may have to sacrifice care of other children, family responsibilities or self-care to follow breastfeeding recommendations.

In this paper we examine breastfeeding in Kenya, with specific attention to women's time. Kenya has made significant strides in increasing women's education, employment and household equality, however low breastfeeding rates have garnered attention from NGOs and government organizations. Depending on the relationship between breastfeeding and women's time, we anticipate that breastfeeding promotion efforts may cause women to invest more time in the care of a single infant, thereby reducing time for economic self-actualization, or other household responsibilities. This paper brings the study of variations in infant feeding strategies into the contemporary discussion of women's empowerment. Through this approach we can begin to explore why breastfeeding practices vary both within and between countries, how breastfeeding practices may be anticipated to change as women's roles continue to change, and to identify time costs of breastfeeding and who can afford to pay those costs.

Analytic Framework

The benefits of both initiating and continuing breastfeeding throughout an infant's life are established and virtually uncontested in research literature. Compared to formula-fed babies, breastfed babies experience fewer health problems related to respiratory infection, diarrhea, diabetes and other infection (American Dietetic Association, 2005; World Health Organization, 1989; The American Academy of Pediatrics, 1997, Allen & Hector,

2005). Breastfeeding also promotes cognitive and sensory development, leading to improved cognitive functioning and higher IQ (for a review of relevant literature see e.g., Anderson, Johnstone, & Remley, 1999). For mothers, the benefits of breastfeeding include infant bonding and decreased risk of post partum depression; as well as physical health benefits such as reduced rates of breast cancer, ovarian cancer and bone demineralization (Ball & Bennett, 2010; World Health Organization: Nutrition: Exclusive Breastfeeding; Enger, Ross, Henderson, & Bernstein, 1997). In a developing world context the benefits are even more dramatic. Along with improved health and development, breastfeeding has been shown to reduce infant mortality due to water-born illnesses, and to assist in fertility regulation through birth spacing (World Health Organization, Arifeen, Black, Antelman, Baqui, Caulfield, & Becker, 2001; Quigley, Kelly, & Sacker, 2007). Breastfeeding also reduces the likelihood of health issues related to poor nutrition common in countries facing high levels of food insecurity. According to the WHO, breastfeeding can also help to preserve valuable family and community resources (American Dietetic Association, 2005), and several studies have demonstrated the societal benefits of breastfeeding such as decreased infant mortality and decreased costs associated with treatment of disease (Riordan, 1997; Bartick, & Reinhold, 2010; World Health Organization, Arifeen, Black, Antelman, Baqui, Caulfield, & Becker, 2001; Quigley, Kelly, & Sacker, 2007, Kaplan & Graff, 2008).

Yet despite the benefits of breastfeeding, currently only 15% of Kenyan infants are exclusively breastfeed for 6 months (**KDHS 2010**). Rates drop to 2% for women in informal settlements in Nairobi (Kimani-Murage, Madise, Fotso, Kyobutungi, Mutua, Gitau, Yatich, 2011). Not only are these rates low in comparison to WHO standards and to trends characterizing Eastern and Southern Africa, but the rates seem to imply a disparity between women in different social and economic situations. Why do so few women in Kenya breastfeed according to the WHO recommendations? We set out to answer this question guided by the hypothesis that low breastfeeding rates, and variation in rates among different socioeconomic groups may reflect time costs of breastfeeding.

While research lists cost-savings as one of the benefits of breastfeeding, source studies analyzing the economic benefits of breastfeeding at the household level have generally focused on cost savings on manufactured goods such as bottles, or savings on food expenditures (FAO: Food Nutrition Pap, 1979; Bhatnagar, Nutan, Tiwari, 1996). More contemporary research on breastfeeding trends in the US is beginning to argue such studies fail to account for, and thus assign no cost value to women's time (Rosin 2009, Rippeyoung, & Noonan, 2012). When we estimate the time required to feed an infant on demand day after day a woman could easily spend as much as ¼ of her day breastfeeding a single child[1] (not to mention the time costs of tandem breastfeeding an infant and a toddler). Time devoted to breastfeeding comes at the expense of care for other children,

[1] This is estimated by assuming that the average infant-mother dyad engages in 12 nursing sessions over a 24 hour period and that each nursing session lasts approximately 30 minutes. This estimate is based on the author's own conversations with healthcare providers in the US but differs dramatically from estimates presented in XX's 1989 work. XX acknowledges that there is very little research on the actual time spent breastfeeding an infant, she does report that, according to related research, a woman spends between 56 minutes and 4 hours/day breastfeeding depending on the country.

gathering fuel, food, or water, caring for livestock or tending to gardens and working out of the house or in an educational setting. We hypothesize that, for some women, this amount of time may result in too great a cost and results in barriers to breastfeeding. We further hypothesize that the required time investment of breastfeeding may be too great a burden for poor and rich Kenyan women alike in both rural and urban areas and may be an important factor in explaining the low trends in breastfeeding in Kenya.

Generally research examining breastfeeding trends (with some notable exceptions – for example see Rippeyoung & Noonan, 2012), and specifically the social costs of breastfeeding tends to focus on the costs of implementing breastfeeding promotion programs (e.g., BFHI), neglecting the high costs faced by mothers who must leave the workforce or abandon educational opportunities. Amendments are made by health organizations and WHO with regard to infant feeding practices with very little attention paid to the increase in cost of these suggested practices (see Leslie, 1989). In the developing world, the problem is particularly complex as the *true costs* associated with breastfeeding cannot be fully quantified in lost wages and diminished educational opportunity because often times women do not work for wages outside of the house.

In Kenya, despite relatively high levels of women's education (about 40% of young women have some secondary school) and recent economic development which has provided more wage earning opportunities, fully 45.6% of women aged 20 – 24, and 36.7% of women aged 25 – 29 do not work outside the home. Even without formal wage earning occupations, Kenyan women still engage in numerous activities which support the household. Women in more traditional family structures generally provide infant and child care, and perform crucial duties like collecting fuel wood and water – often traveling great distances to find these necessary household items. Dedicating time to breastfeeding may represent to great of a time cost for women engaged in these activities who have children and spouses dependent on their contribution. Further, while the quality of breast milk may not be diminished during time of famine and food insecurity, milk production may continue to tax the mother, depleting her energy and nutrients. Issues of famine and malnutrition are particularly relevant for women who live in the drought-prone Northeastern area of the country (Grace et al, 2012) and may possibly become increasing relevant as predictions of drought loom in the future (Funk et al, 2011).

For women employed outside of the home, pressure to breastfeed may result in hardships that extend beyond economic loss. Studies have shown that a lower percentage of household income earned by the mother, correlates to lower food security for household children (Kennedy & Peters, 1992). Inability to work outside the home may create undue reliance on partners, and an environment of food insecurity for other children in the house. Therefore in Kenya metrics based strictly on financial costs associated with breastfeeding fail to capture the true and varied burden of breastfeeding.

To address this heterogeneity of Kenyan women we aim to examine the variations in the type of support provided by women who work inside the home and women who work outside the home. Additionally, because many Kenyans live in the drought prone areas

of the north where seasonal food insecurity is common to effectively quantify the true cost of breastfeeding among the diverse population of Kenyan women, we analyze breastfeeding with relation to the varied demands on women's time according to individual, household and community characteristics. To care for an infant in accordance with World Health Organization recommendations requires women to commit a significant amount of time on a daily basis. However, given that time is a finite resource, we suspect that women with multiple demands on their time will be less able to assume the time-related costs of breastfeeding.

By analyzing a series of time expenses and time capital variables, we can better understand the costs of breastfeeding in non-monetary terms that may be more relevant to women in the developing world. In the following section, we discuss our approach used to analyze the time costs of breastfeeding. Specifically we present the data used for this analysis, along with the independent and dependent variables and a description of the methods. Next we present model results and discuss how those models help us to understand how WHO recommendations may be limiting women's educational and employment opportunities, along with creating undue strain on women, older children and families. Finally, we present conclusions and directions for future research.

Methods and measures

Data

To construct a profile of breastfeeding in Kenya with attention to the full costs of breastfeeding, we examined the most recent (2008) Kenyan Demographic and Health Survey (KDHS) data. From this data we selected variables known to correlate with duration of breastfeeding. These variables included mother's age, mother's BMI, and several characteristics of the child. We then examined available data to construct a list of variables that could indicate a significant time expense for women. Given the multitude of roles occupied by Kenyan woman (work-at-home, outside employment, or both), we included all variable that could constitute a time expense. Based on this list, we constructed five variable categories. Two control groups included: mother's characteristics and child's characteristics. The time expenses variables were divided into three categories: household obligations, employment obligations, and support. Household obligations and employment obligations include ***time expenses***: defined as direct competition for mother's time, and ***time capital*** defined as factors that help the mother meet financial or household obligations.

Independent variables

In Table 1 we list the independent variables to be used in the analysis. We further explain the variables below.

Table 1: Independent variables

Category	Variables
Mother Characteristics	• Age

	• BMI • Pregnant (Y/N) • Desire for more Children
Infant Characteristics	• Size • Sex • Birth Order
Time Expense: Household	• Most recent birth interval • Children under 5 • Time to collect fuel wood • Time to collect water
Time Expense: Employment	• Education, • Type of employment, • Earns money, • Livelihood zone / type of place of residence (urban vs. rural)
Time Capital: Social Support	• Partnership status • Age of partner • Education of partner • Adults in home • Length of current residency • Ethnicity

Mother / Child Characteristics: Mother's characteristics includes known correlates with duration of breastfeeding ranging from mother's age and education level. The category also includes mother's body mass index (BMI). Mother's BMI is included as a proxy for overall food security at the time of survey. Mother's BMI is an anticipated to have a dual effect on duration of breastfeeding. First, many breastfeeding women assume a link between their own nutritional status and the nutritional content of the milk they produce. Second, while the quality of milk remains consistent during times of food insecurity, milk production constitutes a physical tax that may be harder to weather during times of food insecurity. We also include several child characteristics known to correlate with duration of breastfeeding. These variables include the sex of the child and the perceived size of the child at birth. Depending on the culture, the size and sex of the child can be proxy indicators of the "investment" constituted by the child. In some cases breastfeeding may effectively cause a woman to stop ovulating and thus becoming temporarily infecund for a period of time. Therefore women who want more children may breastfeed for shorter periods of time to shorten the infecund period.

Household Obligations: The total fertility rate in Kenya is 4.6. As such, it can be assumed that a large share of recent births in Kenya are not first births. Thus both work-at-home women and women employed outside the home are likely to have obligations related to their other children. The household obligation category includes variables

designed to assess the amount of time women are caring for children in the home such as most recent birth interval, and the number of children under age 5. Furthermore, in traditional Kenyan homes, women are more likely than men to be responsible for duties such as collecting fuel wood, and collecting water. These can be burdensome obligations for women, and constitute a large time investment in support of the care and feeding of the family. Therefore, the household obligations category includes variables for time to collect fuel wood and time to collect water.

Employment Obligations: Efforts to improve the economic and educational opportunities for women in sub-Saharan Africa have resulted in a raised awareness of challenges facing women and young girls in Africa – including discrimination in employment and educational opportunities, domestic and sexual violence and poor political representation. Broadly defined as "people's ability to make strategic life choices in a context where this ability was previously denied to them" (Kabeer, 2001 in Upadhyay & Karasek, 2010), the measurement of gender equality at the household level tends to include measures of disparity in age, income and education, along with participation in various types of household decisions. Another important component of gender equality lies in a woman's ability to exercise agency in her own fertility decisions. According to Upadhyay and Karasek (2010), efforts towards gender equality are also likely to consist of a convergence in desired versus actual fertility rates, and a decline in the total fertility rate. According to the authors, as empowerment improves, women will seek roles and opportunities in addition to motherhood, and that by limiting her number of children, she will have additional resources to invest in herself and her family. However, this likely entails spending less time on motherhood duties in favor of diving time between obligations at home and at work. This is a positive step in women's empowerment, however it may result in reduced time for breastfeeding. To assess these demands on mother's time, we include variables for type of employment and whether the employment is paid or unpaid. We also include community information related to the dominant livelihood strategy of the area (pastoralists, agriculturalists, fishing, etc.) as well as if the community is urban or rural. We hypothesize that cultural trends in infant feeding may be partially explained by community resources (as measured by urban versus rural) or by living in a food insecure environment (as indicated by dominant livelihood strategy).

Support: Breastfeeding, and the decision to breastfeed is not made independently. Partnership status is likely to have a bearing on a woman's ability to breastfeed. Not only are women-headed households in Kenya more likely to be poor, but we can also assume that women-headed households are also more reliant on the mother's income. As such, non-partnered women heading households are likely to breastfeed for shorter periods than partnered women. Further, the ability of the partner to provide income and food security during time period of time when a woman would be breastfeeding will likely have a positive correlation with the woman's ability to be available to her baby during the six months of exclusive breastfeeding on demand. The support category, therefore, includes variables to measure not only partnership status, but age of partner and education of partner. Yet breastfeeding may also be supported or discouraged by a community of support. A mother with several children, who can delegate care of her children to her mother, sister or other community member, may have time to devote to extended

breastfeeding. As such, we include other support variables which may have a positive effect on the amount of time capital a mother has available and the strength of her community support, including other adults in the home, length of current residence, and ethnicity.

Dependent variables

We use the survey data to construct three different variables to serve as the dependent variables in our analysis: first a dichotomous variable of ever breastfed (yes or no); second a continuous variable: duration breastfed, (for those mother/child dyads who are no longer breastfeeding calculated for the most recent birth); third, a dichotomous variable for currently exclusively breastfed 4, 5 or 6 month olds (for those mother/child dyads who were breastfeeding at the time of the survey[2]).

Statistical Analysis

To model the variation in the two dichotomous variables – ever breastfed and exclusively breastfed (for infants aged 4-6 months at the time of the survey) we use a logistic regression (McCullagh and Nelder, 1998). We construct separate models for each of the outcome variables corresponding to each of the hypotheses as outlined above.

To understand the factors correlated to different breastfeeding durations we apply quantile regression to our continuous breastfeeding variable. Quantile regression differs from standard regression in that we are allowed some important flexibility in the construction of the regression equation (Koeneker??). Rather than constructing regression models based on the expected value of the outcome variable (the mean), we construct different regression models for selected quantiles of the distribution of the outcome variable. By constructing a model based on the quantiles of the distribution we can examine the change in the slope (rate of change) between the independent variables and duration breastfed at different points along the curve of duration breastfed. In other words we allow for the possibility that the relationship between women's educational

[2] Measuring length of time of exclusive breastfeeding is somewhat complex when using population surveys like the DHS. In the KDHS case, the only data provided in the survey data is currently breastfeeding (yes/no) and a listing of what the child was fed in the last 24 hours and the last 7 days. Therefore we can distinguish exclusive breastfed infants from those who are fed with both breastmilk and complementary foods but only among the currently breastfed infants. We are not able to measure the duration of time of exclusive breastfeeding among infants/children who are no longer breastfed. Furthermore we are not able to measure the duration of exclusive breastfeeding if the child has begun ingesting any other food in addition to breastmilk. We can, however, count the number of exclusively breastfed infants among those who are breastfed – which is the way we have constructed this variable.

attainment and very short (perhaps the 10^{th} quantile (lowest 10% of the durations reported)) breastfeeding periods differs as compared to the relationship between breastfeeding for long periods and educational attainment. This allows us to move the analysis towards evaluation of maternal/child characteristics that are related to particularly long or short periods of breastfeeding. While we are indeed interested in average breastfeeding behavior (as captured by constructing a model at about the 50^{th} quantile) we are equally, or perhaps more, interested in the behaviors associated with very short periods of breastfeeding.

Preliminary Results

In approving the National Reproductive Health Policy, the Kenyan Ministry of Health listed "reducing neonatal and child mortality" alongside "achieving women's empowerment and gender equality" among ICPD and Millennium Development Goals. Yet recommendations made in support of reducing infant mortality include demands on women that may actually negatively impact strides towards women's empowerment. Because very little attention has been paid to the cost of women's time in implementing the recommended infant feeding practices it has been difficult to determine either the short- or long-term costs and benefits to women and children of the WHO recommended breastfeeding strategies. Our study focuses on Kenya a dynamic country in sub-Saharan characterized by rapid development and increasing opportunities for women as well as high food insecurity, high infant mortality and low breastfeeding rates. We anticipate that our results will show that a large share of Kenyan women cannot afford the time required to breastfeed according to the WHO standards. The poorest women supporting their large families through the care of other children, collecting fuelwood and water and caring for livestock or crops likely cannot afford to take time away from their domestic work to spend hours a day breastfeeding. Likewise, women with high levels of education who work in paid positions, who have arguably made important strides towards gender equality, cannot take the time away from their paid positions to nurse their infants as maternity leave is not an option and the household is dependent on their financial contribution. Ultimately our results will highlight the struggles faced by women trying to meet the needs of their families with little support and few resources.

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