



The Roles of Social Support on Adolescent and Maternal Health Behaviors in Sub-Saharan Africa

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THE ROLES OF SOCIAL SUPPORT ON ADOLESCENT AND MATERNAL
HEALTH BEHAVIORS IN SUB-SAHARAN AFRICA

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A Dissertation Submitted to the Faculty of

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Abstract

My dissertation research investigates the roles of social support on adolescent and maternal health behaviors in Sub-Saharan Africa. This research aims to address knowledge gaps that exist in research on the impact of social support on health behaviors amongst women and youth in Sub-Saharan Africa. There is a dearth of research on how social support may influence adolescent risky health behaviors such as substance use and risky sexual behaviors, or maternal breastfeeding practices such as early breastfeeding initiation or pre-lacteal feeding in sub-Saharan African.

This dissertation is made up of three papers. Papers 1 and 2 investigate the impact of parental social support on adolescent substance use initiation and risky sexual behavior respectively, in South Africa. Data from Wave 1 and 3 of the Cape Area Panel Study (CAPS) were used in both papers to conduct regression analyses to assess whether lack of parental social support is associated with higher risk of substance use initiation (paper 1) and risky sexual behaviors (paper 2) by adolescents in South Africa. The results of the analyses indicate that lack of frequent family meals with mothers is a significant longitudinal predictor of alcohol consumption initiation. Also, there were increased risks of multiple sexual partnerships among adolescents who never ate meals with their mothers, and among those who never discussed personal matters with their fathers. Also, adolescents who never got money for gifts or pocket money from their mothers were more likely to engage in unprotected sex during their first sexual

encounter compared to those who got money from their mothers. Paper 3 investigates the cross-sectional association between social support and breastfeeding practices amongst women in Nigeria. Social support from mothers and fathers were associated with higher prevalence of early breastfeeding initiation and avoidance of pre-lacteal feeding respectively. Also, high levels of physical support were associated with higher likelihood of avoiding pre-lacteal feeding.

In conclusion, the associations between social support and adolescent risky behavior in South Africa or maternal breastfeeding behavior in Nigeria are complex. Other predictors outside the family or peer influences may be stronger drivers of adolescent and maternal health behaviors in here.

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Introduction

Several studies in social epidemiology and social psychology have demonstrated that high levels social support have positive effects on physical, mental, and social health ((Franks, Campbell, and Shields 1992; House, Landis, and Umberson 1988; Biegel, Magaziner, and Baum 1991; Leung et al. 2007; Seeman et al. 1987). There are several hypothesized ways through which social support impact people's health, although there is very little accepted theory about how social support or its components exerts its beneficial effect (House, Landis, and Umberson 1988; Franks, Campbell, and Shields 1992; Connell and D'Augelli 1988; O'Reilly 1988; Stewart 1989). Social support may (1) exert direct beneficial effect on health through the provision of basic human needs for intimacy, companionship, reassurance and a sense of belonging (Franks, Campbell, and Shields 1992; Berkman et al. 2000; Williams, Ware, and Donald 1981); (2) buffer the adverse effect of stressors by enhancing individual coping resources and community resources, and also influence the frequency and duration of exposure to stressors (Franks, Campbell, and Shields 1992; House, Landis, and Umberson 1988; Israel 1982; Berkman et al. 2000); (3) exert potential effect on health behavior and alter patterns of health-related behaviors through the interpersonal exchanges within a social network where individuals are supported and influenced in such health behaviors (Yang et al. 2013; Broszkiewicz et al. 2004; Babey, Wolstein, and Diamant 2015; Osamor 2015; Wang, Hipp, et al. 2015; Sidze et al. 2015).

Previous studies and interventions have shown that social support could be utilized to encourage health enhancing behavior or discourage risky health behaviors among adults such as smoking cessation (Palmer, Baucom, and McBride 2000; Broszkiewicz et al. 2004; Lawhon et

al. 2009; McMahon and Jason 2000; Yang et al. 2013; Yang et al. 2015; Steptoe et al. 1996), weight loss/physical activity (Wing and Jeffery 1999; Babey, Wolstein, and Diamant 2015; Cooper et al. 2015; Fang et al. 2015b; Steptoe et al. 1996), adherence to medical regimens/medications (Cooper et al. 2015; DiMatteo 2004; Kim et al. 2015; Osamor 2015; Poudel et al. 2015; Qi et al. 2015; Zhang et al. 2015), alcohol/drug use (Wills and Vaughan 1989; Chabrol et al. 2008; Lee and Tak 2005; Loveland-Cherry et al. 1996; Nash, McQueen, and Bray 2005a; Samek et al. 2015; Wang et al. 2016), risky sexual behaviors (Miller 2002; Velez-Pastrana, Gonzalez-Rodriguez, and Borges-Hernandez 2005; Biddlecom, Awusabo-Asare, and Bankole 2009; DiClemente, Wingood, Crosby, Cobb, et al. 2001; Karofsky, Zeng, and Kosorok 2001; Marston et al. 2013; Sidze et al. 2015). The life situation of adolescents/young adults, in particular, is somehow peculiar since it is recognized that adolescents and young adults derive support either from peers or from parents and that these different sources of support may have different effects on young peoples' behavior (Wills and Vaughan 1989; Simons-Morton et al. 2001; Burke and Weir 1979). Since young adults are in a state of transition between adult and peer social networks, it has been postulated that peer and adult networks may have different orientations towards health-related behaviors by young adults (Wills and Vaughan 1989). In fact, it has been shown that young adults with high social support from adults are less likely to use substances while peer-network involvement is positively associated with substance use (Wills and Vaughan 1989). Also, it has been shown that youth who have greater parental connectedness, involvement, supervision and support are more likely to postpone sexual activity and have decreased risk of adolescent pregnancy compared to those with lower parental support (Miller 2002; Crockett et al. 1996; Chilman 1986).

There is a wealth of literature on studies that have evaluated the impact of social support from both formal/professional social networks (healthcare workers, doulas, breastfeeding consultants) and informal social networks (family, friends and peers) on breastfeeding practices. Some systematic reviews and one intervention study note positive associations between social support and healthy breastfeeding practices (Renfrew et al. 2012; Langer et al. 1998; McFadden et al. 2017), but other reviews note mixed results (Jolly et al. 2012; Sikorski et al. 2003; Sipsma, Jones, and Cole-Lewis 2015). Few studies, however, have explored the relationships between formal or informal social support and breastfeeding practices in SSA in general and Nigeria in particular (Olayemi et al. 2007; Sudfeld, Fawzi, and Lahariya 2012; Tylleskar et al. 2011; Mangasaryan et al. 2012). There are still major knowledge gaps in the association between social support and breastfeeding practices, especially in developing countries. These gaps are due to the overall mixed findings from the limited previous studies. Also, most of these studies in developing countries investigated only support from husbands, older female relatives or peers on exclusive breastfeeding or breastfeeding duration (Mangasaryan et al. 2012; Olayemi et al. 2007; Sudfeld, Fawzi, and Lahariya 2012; Tylleskar et al. 2011). No studies, to our knowledge, have explored the differential effect of all the possible different sources (i.e. spouse, mothers, fathers, siblings, friends, neighbors, mothers-in-law, co-wives) or different types (i.e. emotional e.g. love, informational e.g. advice, physical e.g. household chores, and financial e.g. monetary gifts or loans) of social support (House 1981) on breastfeeding initiation and pre-lacteal feeding.

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Paper 1:

Adolescent Substance Use Initiation in South Africa: An Investigation of the Importance of Parental Social Support

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1 Abstract

Purpose – There has been a rising prevalence of substance (especially alcohol and cigarettes) use among adolescents in developing countries. Our study investigates the impact of different types of parental social support on substance use initiation among adolescence in South Africa.

Methods – We used data from Wave 1 and Wave 3 of the Cape Area Panel Study. We conducted logistic regression analyses adjusted for sociodemographic characteristics to assess whether lack of specific categories of parental social supports are associated with higher risk of alcohol and cigarette use initiation by adolescents.

Results - The results of logistic regression analyses indicate that lack of frequent family meals together, especially with mothers, is a significant longitudinal predictor of alcohol consumption initiation (RR=1.67, 95% CI: 1.17-2.37), while not sleeping under the same roof with mother is negatively associated with alcohol consumption initiation (OR=0.61, 95%CI: 0.43-0.87). Also, compared with paternal social support, maternal social support appears to have a stronger association with adolescent alcohol use initiation. Finally, cigarette smoking at baseline has a statistically significant association with alcohol use initiation at follow-up (OR=1.37, 95%CI: 1.16-1.62).

Conclusion - We conclude that an association between parental social support and adolescent substance use initiation in South Africa is complex, and that other predictors outside the family may override the impact of parental support. Therefore, resources should be devoted to strengthening the enforcement of policy regulations, and on more research to unravel the underlying mechanisms through which parental social support influences substance use initiation in South Africa.

1.1 Introduction

Substance use (especially alcohol and cigarettes) among adolescents is a major public health challenge globally (Hassan et al. 2009). A review of the first (2002), second (2008) and third (2011) South African National Youth Risk Behavior Surveys indicate that the age of initiation of substance use remained stable: 12% of adolescents initiated alcohol use prior to age 13 years while 7% initiated cigarette smoking before the age of 10 years (Reddy et al. 2013; Ramsoomar and Morojele 2012; Reddy et al. 2010). However, emerging trends in the availability of substances among adolescents due to aggressive marketing by industries, coupled with the limited capacities to enforce effective regulatory measures against substance use is leading to rising prevalence of use among adolescents in developing countries, including South Africa (Degenhardt et al. 2016; South African Government Gazette 2015).

Promoting effective family social support resources such as parental social support (McPherson et al. 2013) to complement the weak regulatory environment would be an appropriate intervention in most developing countries to counter the onset and frequency of substance use by adolescents. Parental involvements through social support, guidance, and communication play important roles as protective factors on initiation and use of substances by adolescents (Fang et al. 2015a; Samek et al. 2015). There are, however, limited data on the association between parental involvement and substance use initiation by young people in developing countries, including South Africa.

According to empirical evidence, parental monitoring and provision of social support are the most critical processes through which parents exert influence on the social development of their children (Hernandez, Rodriguez, and Spirito 2015). Some studies show that parental monitoring and supervision were associated with lower levels of adolescent substance use

(Maslowsky et al. 2015; Hernandez, Rodriguez, and Spirito 2015; Samek et al. 2015). Other studies show that lack of parental emotional closeness and support were associated with higher likelihood of involvement with substance-using friends and consequently substance use (Nash, McQueen, and Bray 2005b; Germán, Gonzales, and Dumka 2009). Other investigators found that the best predictor of adolescent substance use initiation in South Africa was an association with peers who use substances (Moodley, Matjila, and Moosa 2012; Olumide et al. 2014).

No studies, to our knowledge, have explored precisely the association between parental involvement and onset of substance use by adolescents in South Africa. It is imperative to understand this relationship in this context, since it has been shown in the United States that active parental involvement and more time spent with the family by adolescents may buffer the negative influences of substance-using peers and provide protection from substance use initiation (Schofield, Conger, and Robins 2015; Marschall-Lévesque et al. 2014). In this study, we explored the differential effect of maternal vs. paternal support, and of different types of parental support (emotional, appraisal, and instrumental support) on the onset of substance use.

We conducted a study utilizing a longitudinal panel data (2002 – 2005) of 4,121 adolescents in South Africa, aged 14 – 22 years to investigate: 1.) if lack of specific categories of parental social support (i.e., emotional, appraisal and instrumental support) are associated with higher risk of initiation of substance use by adolescents, 2.) Whether there are differential impacts of maternal vs. paternal support on the onset of substance use, and 3.) Whether the association between prior cigarette smoking with alcohol use initiation is stronger than that between prior alcohol drinking with cigarette smoking initiation. The main aim of this study was to investigate the longitudinal association between parental social support and initiation of substance use by adolescents in South Africa. We hypothesized that adolescents who received no

social support from their parents would be more likely to initiate substance use compared to those who received some form of support. We also hypothesized that maternal social support would be more protective of substance use initiation compared to paternal support (Benchaya et al. 2011; Wang, Ho, et al. 2015), and that the association between prior cigarette smoking with alcohol use initiation would be stronger than that between prior alcohol drinking with cigarette smoking initiation (the “gateway drug theory”) (Chen et al. 2002; Parra-Medina et al. 1995).

1.2 Methods

1.2.1 Data Collection

This study used data from Wave 1 (2002) and Wave 3 (2005) of the Cape Area Panel Study (CAPS) young adult questionnaire, a longitudinal study of adolescents and young adults aged 14-22 years and living in the Cape Town metropolitan area. The sampling design, methods and population characteristics of CAPS have been discussed in detail elsewhere (Lam, Marteleto, and Ranchhod 2013; Tenkorang, Maticka-Tyndale, and Rajulton 2011; Tibesigwa and Visser 2014; Beauclair et al. 2012; Camlin and Snow 2008). CAPS used a stratified multistage sampling design to select the participants for the study, first selecting enumeration areas (EA) used in the 1996 South African Census as the primary sampling units (PSUs) and then using households within each EA as the secondary sampling units. The design also used population characteristics of enumeration areas to oversample Black and White participants to generate an approximately equal sample of each racial and ethnic group (Black African, White, and Colored/Biracial). Overall, 4,752 participants were surveyed in 2002 (wave 1), and follow-up data were available for 3,536 (74.4%) in 2005 (wave 3). Wave 2 (2003/2004) of the CAPS does not have data on substance use and parental support which are the primary variables of interest in this present study. The eligible analytic sample for the current analysis included 4,121 respondents who had

not initiated *either* alcohol consumption *or* cigarette smoking at baseline (wave 1) The Harvard T. H. Chan School of Public Health IRB committee reviewed and approved the exempt status of our research.

1.2.2 Dependent variables

In both waves 1 and 3, CAPS included an item about past month use of alcohol (i.e., "Over the past month, have you consumed any alcohol?"), and cigarette smoking (i.e., "Over the past month, have you smoked any cigarettes?"). Response options were yes and no for each item in both waves. Each respondent's answers to each question on alcohol use and tobacco use were coded as "0" if he/she answered "no" and "1" if he/she answered "yes."

1.2.3 Independent variables

Five items were included in the CAPS survey to capture different domains of parental social support (emotional, appraisal and instrumental). Each item on both maternal and paternal support has a set of eight response categories for frequency of occurrence of each type of social support ranging from daily or almost daily, once a week, once or twice a year, to never. We constructed dichotomous values of "never" versus "ever" from these eight responses. Each respondent's answers to each question on each type of maternal and paternal support were coded as "1" if he/she answered "never" and "0" if he/she answered "ever." All of the independent variables used in our analyses were measured at wave 1 (2002) to ensure that they preceded alcohol or cigarette use initiation at wave 3 (2005).

1.2.3.1 Maternal Social Support

Maternal social support was assessed by asking the following questions: 1.) How often has your mother spent time with just you in the past 12 months? (2) How often has your mother

discussed personal matters with you in the past 12 months? (3) How often has your mother eaten meals with you over the past 12 months? (4) How often has your mother spent the night under the same roof as you in the past 12 months? (5) How often has your mother given you pocket money or money for gifts, clothes in the past 12 months? Each of these questions was treated as binary variables (never vs. ever) and modeled as independent variables in the multivariable logistic regression model.

1.2.3.2 Paternal Social Support

Paternal social support was assessed by asking the same questions as for maternal social support above.

1.2.4 Confounders

The sociodemographic variables included in our analyses were measured at wave 1 (2002) and include the following: Age (Continuous), Sex (Female/Male), Race (Black/Colored/White), Education (High School or more/Less than high school), and Household per Capita income, in quartiles (Lowest/Low-middle/Middle-higher/Highest). Age was stratified into two categories (14-17 years, and 18-22 years) for descriptive purposes (Table 1) and employed as a continuous variable in all analyses. The other racial groups in Cape Town, including Asians, were excluded from the analyses because there were very few young adults in this category. The household per capita income was derived by adding up all the monthly household income and dividing the total by the number of people in the household (Camlin and Snow 2008).

1.2.5 Statistical analysis

All analyses were conducted using STATA version 12 SE (StataCorp 2011). The appropriate sampling weights were applied to the dataset during the analysis to account for the critical elements of the cluster sampling design – including the oversampling of Black and White households, a differential sampling of households with and without young adult members, etc. Descriptive statistics were used to examine the characteristics of the study sample in wave 1 and wave 3. A Chi-square test was used to compare the sociodemographic variables of the samples at both waves to assess if there were statistically significant changes in the time-invariant demographic variables such as gender and race due to attrition and non-responses. We then, estimated the bivariate relationship between the sociodemographic variables (wave 1) and the onset of alcohol and tobacco use (wave 3) using chi-square test (Table 1.1). The distributions of parental social support according to the source of support (i.e., maternal vs. paternal support), race and household per-capita income at wave 1 are shown in Table 1.2.

Furthermore, multivariable logistic regression analyses were conducted to examine the association between each of the types of maternal and paternal social supports in 2002 (wave 1) and the onset of alcohol and cigarette use in 2005 (wave 3) using the logit link function in STATA (Table 3). The risk ratio (RR) and the 95% confidence intervals (CI) were derived in each case. All the effect estimates were expressed as risk ratios (RR) instead of odds ratios (OR) because of the high prevalence of substance use initiation (>10%) among our study population. The rare disease assumption required by odds ratios have been violated, and the adjusted odds ratios derived from the logistic regression can no longer approximate the risk ratios (Zhang and Kai 1998).

We conducted three multivariable regression models to estimate the unadjusted, adjusted and interaction associations of each type of parental social support and onset of alcohol and cigarette use. In model 1, we estimated the crude associations of types of parental social support and each substance use initiation separately for maternal and paternal support. In model 2, we adjusted for the sociodemographic variables (Table 1.3). Since our analytic sample is made up of participants who had not initiated either alcohol or cigarette use at wave 1, we also controlled for whether they initiated the other substance at wave 1 in model 2.

Finally, we specified interaction terms to test effect measure modification of the association of parental social support and onset of substance use by age categories, sex, and race in model 3. The tables for the results of model 1 and model 3 were not shown here since the interaction terms were not statistically significant.

1.3 Results

1.3.1 Socio-demographic characteristics according to substance use initiation

Table 1.1 presents the sociodemographic characteristics of the adolescents who had not initiated either alcohol drinking or cigarettes smoking at wave 1 (2002) stratified according to alcohol and cigarette use initiation at wave 3 (2005). The mean age of the participants was 17.7 (SD 2.5) years at wave 1; 49% was aged 16-17 years. Almost 58% of the participants were female, and the majority were Black Africans (49%) compared to Colored (39%) and Whites (11%). Sixty percent had completed high school or more education. Adolescents resided in households with per capita income in the highest income range (36%) and middle-higher income range (25%) compared to those in the low-middle income (21%) and lowest income (17%) ranges. Overall, there were no statistically significant differences due to attrition or declined

responses in the distribution of time-invariant variables (sex and race), and household per capita income between the two waves (data not shown).

Table 1.1 shows that about 33% of the adolescents initiated alcohol drinking at wave 3 and that about 30% started cigarette smoking at wave 3. Higher proportions of older participants initiated alcohol drinking (35%) compared to the younger participants (32%). Conversely, younger participants were more likely to start cigarette smoking (32%) compared to the older adolescents (32% vs. 28%, $p=0.038$). Higher proportions of males compared to females initiated both alcohol drinking (44% vs. 25%, $p<0.001$) and cigarette smoking (41% vs. 22%, $p<0.001$) at wave 3. White participants were most likely to initiate alcohol drinking (68%) compared to Colored (34%) and Blacks (25%); the Colored were most likely to initiate cigarette smoking (47%) compared to the Whites (25%) and the Blacks (15%), ($p<0.001$ in both situations). Participants with higher education were more likely to initiate alcohol drinking compared to the less educated ones (35% vs. 30%, $p=0.002$), but less educated participants were more likely to start cigarette smoking compared to their more educated peers (33% vs. 28%, $p=0.001$). Adolescents from the highest income range were most likely to initiate alcohol (41%) and tobacco use (32%) compared to the other income groups ($p<0.001$).

Table 1.1: Socio-demographic Characteristics of the Young Adults who have not initiated alcohol drinking or cigarette smoking at wave 1 (2002) Stratified according to Alcohol and Cigarette Use Initiation at Wave 3 (2005)

N=4,121

Demographic Characteristics at Baseline (2002)				Substance Use Initiation at Follow-up (2005)					
		Total		Alcohol Use Initiation			Cigarette Use initiation		
		n (%)	Mean (SD)	Yes n (%)	Total n	p-value	Yes n (%)	Total n	p-value
Age (continuous)		4,121 (100)	17.7 (2.5)						
Age (categories)	<i>Younger (16-17)</i>	2,033 (49.3)		523 (31.7)	1,651	0.077	524 (31.7)	1,654	0.038
	<i>Older (18-22)</i>	2,088 (50.7)		496 (34.7)	1,430		404 (28.3)	1,430	
	<i>Total</i>	4,121		1,019 (33.1)	3,081		928 (30.1)	3,084	
Sex	<i>Female</i>	2,368 (57.5)		432 (24.8)	1,744	<0.001	386 (22.1)	1,746	<0.001
	<i>Male</i>	1,753 (42.5)		587 (43.9)	1,337		542 (40.5)	1,338	
	<i>Total</i>	4,121		1,019 (33.1)	3,081		928 (30.1)	3,084	
Race	<i>Black</i>	2,034 (49.4)		361 (25.2)	1,434	<0.001	221 (15.4)	1,435	<0.001
	<i>Colored</i>	1,618 (39.3)		469 (34.3)	1,367		637 (46.5)	1,369	
	<i>White</i>	469 (11.4)		189 (67.5)	280		70 (25.0)	280	
	<i>Total</i>	4,121		1,019 (33.1)	3,081		928 (30.1)	3,084	
Education	<i>High School or More</i>	2,460 (59.8)		632 (35.4)	1,788	0.002	497 (27.8)	1,790	0.001
	<i>Less than High School</i>	1,655 (40.2)		386 (30.0)	1,289		430 (33.3)	1,290	
	<i>Total</i>	4,115		1,018 (33.1)	3,077		927 (30.1)	3,080	
Household per capita Income (in quartiles)	<i>Lowest Income (R0-R233/month)</i>	718 (17.4)		102 (26.3)	388	<0.001	79 (20.4)	388	<0.001
	<i>Low-Middle Income (R234-R467/month)</i>	884 (21.4)		186 (26.1)	639		179 (28.0)	639	
	<i>Middle-Higher Income (R468-R989/month)</i>	1,042 (25.3)		243 (30.0)	811		270 (33.3)	811	
	<i>Highest Income (R990-R27,810)</i>	1,474 (35.9)		433 (41.1)	1,053		339 (32.1)	1,056	
	<i>Total</i>	4,118		964 (33.3)	2,891		867 (30.0)	2,894	

Notes: 6 (0.2%) cases missing education, and 3 (0.1%) cases missing household per capita income.

1.3.2 Distribution of parental social support at wave 1 (2002)

Table 1.2 presents the distributions of parental social support at baseline according to the source of the support (maternal vs. paternal), race of the young adult, and household per capita income. Receipt of social support differed by the sex of the parents. The proportion of adolescents who did not receive social support from their mothers ranged from 8.5% to 25%, while the range of paternal non-support ranged from 30% to 53% ($p < 0.001$ for maternal/paternal differences). Greater proportions of Black African adolescents reported non-receipt of parental social support compared to the lower proportions of White and Colored adolescents who reported non-receipt of parental support.

Table 1.2: Distribution of Parental Social Support according to the Source of Support (Maternal vs Paternal), Race of Young Adult and Household Per-Capita Income at wave 1 (2002)

N=4,121

			Independent Variables at Wave 1 (2002)									
			Parent Spent Time with Young Adult		Parent Discussed Personal Matters		Parent Ate Meals together		Parent Slept under same Roof		Parent Spent Money on Gift/Pocket Money	
			Never n (%)	Total n	Never n (%)	Total N	Never n (%)	Total n	Never n (%)	Total n	Never n (%)	Total n
Source of Parental Social Support	Mother		533 (13.8)	3,857	961 (25.0)	3,850	330 (8.5)	3,972	393 (10.2)	3,866	714 (18.6)	3,845
	Father		1,263 (37.2)	3,393	1,798 (53.2)	3,382	1,035 (30.3)	3,412	1,111 (32.7)	3,403	1,237 (36.7)	3,368
	Pearson Chi-square	t-statistic	22.7** *		31.5** *		21.0** *		23.9***		13.9** *	
Maternal Support	Race	Black	305 (16.3)	1,869	551 (29.5)	1,865	226 (12.0)	1,877	249 (13.3)	1,871	490 (26.3)	1,861
		Colored	202 (13.2)	1,535	372 (24.3)	1,532	90 (5.9)	1,537	126 (8.2)	1,537	203 (13.3)	1,527
		White	26 (5.8)	453	38 (8.4)	453	14 (3.1)	458	18 (3.9)	458	21 (4.6)	457
		Pearson Chi-square	35.2** *		87.7** *		61.4** *		46.3***		161.2** **	
	Household per capita Income	Lowest	46 (12.1)	380	108 (28.5)	379	23 (6.1)	380	26 (6.8)	380	86 (22.7)	375
		Low-Middle	92 (14.9)	615	164 (26.8)	611	48 (7.8)	615	58 (9.4)	616	119 (19.4)	612
		Middle-Higher	108 (13.8)	781	221 (28.4)	779	71 (9.0)	785	84 (10.7)	782	140 (17.9)	782
		Highest	107 (10.4)	1,031	195 (18.9)	1,028	59 (5.7)	1,034	72 (6.9)	1,034	126 (12.3)	1,025
	Pearson Chi-square	t-statistic	8.9* *		28.3** *		8.6* *		10.2* *		27.8** *	
Paternal Support	Race	Black	665 (43.5)	1,530	895 (58.7)	1,526	571 (37.1)	1,539	586 (38.3)	1,532	715 (47.3)	1,512
		Colored	534 (37.5)	1,423	797 (56.3)	1,415	418 (29.3)	1,426	463 (32.5)	1,423	477 (33.9)	1,409
		White	64 (14.6)	440	106 (24.0)	441	46 (10.3)	447	62 (13.8)	448	45 (10.1)	447
		Pearson Chi-square	122.4** **		174.4** **		119.0** **		94.0***		214.3** **	
	Household per capita Income	Lowest	129 (42.3)	305	182 (59.9)	304	111 (36.5)	304	118 (38.6)	306	122 (40.9)	298
		Low-Middle	238 (46.7)	510	301 (59.6)	505	193 (37.9)	509	206 (40.4)	510	244 (49.1)	497
		Middle-Higher	279 (40.7)	686	429 (62.6)	685	236 (34.2)	690	243 (35.5)	684	265 (38.9)	681
		Highest	271 (28.1)	965	424 (44.1)	962	196 (20.2)	972	225 (23.2)	969	242 (25.1)	963
	Pearson Chi-square	t-statistic	60.8** *		69.2** *		72.2** *		60.7***		92.2** *	

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

1.3.3 Multivariable logistic regression of the association between parental social support at baseline (2002) and alcohol use initiation at follow-up (2005).

Table 1.3 shows the results of multivariable models estimating associations between parental social support in 2002 (baseline), and the onset of alcohol use in 2005 (follow-up) adjusted for sociodemographic variables, alcohol, and tobacco use at baseline. Adolescents who never ate meals together with their mothers at baseline have a higher risk of alcohol use initiation at follow-up compared to adolescents who ate meals together with their mothers at baseline (RR=1.67, 95% CI:1.17-2.37). Conversely, those adolescents whose mothers never slept under the same roof with them at baseline have a lower risk of onset of alcohol use at follow-up (RR=0.61, 95%CI: 0.43-0.87) compared to those adolescents whose mothers slept under the same roof with them at baseline. Also, there are no statistically significant associations between any type of paternal social support and the onset of alcohol use.

Overall, maternal social supports appear to have a stronger association with adolescent alcohol use initiation compared to paternal social support. Also, further analyses reveal that the beta estimates for effect measure modification of the relationship between maternal social support and onset of substance use by age categories, sex or race were not statistically significant (results not shown).

1.3.4 Multivariable logistic regression of the association between parental social support at baseline (2002) and cigarette smoking initiation at follow-up (2005)

Table 1.3 shows the results of multivariable models estimating associations between parental social support in 2002 (baseline), and the onset of cigarette smoking in 2005 (follow-up) adjusted for sociodemographic variables, alcohol, and cigarette use at baseline. There are no

statistically significant associations between any types of maternal and paternal social support at baseline and onset of cigarette smoking at follow-up.

Finally, prior cigarette smoking at baseline has a statistically significant association with alcohol use initiation at follow-up (RR=1.37, 95%CI: 1.16-1.62), while prior alcohol use at baseline is not associated with cigarette smoking initiation at follow-up (RR=1.02, 95%CI: 0.75-1.39).

Table 1.3: Multivariable Logistic Regression of the association between Maternal and Paternal Social Support in 2002 and Substance Use (Alcohol & Cigarette) Initiation in 2005

Independent Variables Wave1 (2002)		Maternal				Paternal			
		Alcohol Use Initiation (2005)		Cigarette Use Initiation (2005)		Alcohol Use Initiation (2005)		Cigarette Use Initiation (2005)	
		RR	95%CI	RR	95%CI	RR	95%CI	RR	95%CI
<i>Parent Spent Time</i>	<i>Ever</i>	1		1		1		1	
	<i>Never</i>	1.42	(0.93-2.16)	1.09	(0.73-1.62)	0.91	(0.57-1.46)	0.98	(0.64-1.50)
<i>Parent Discussed Personal Matters</i>	<i>Ever</i>	1		1		1		1	
	<i>Never</i>	0.76	(0.55-1.04)	1.10	(0.83-1.46)	1.10	(0.83-1.45)	1.06	(0.76-1.46)
<i>Parent Ate Meals Together</i>	<i>Ever</i>	1		1		1		1	
	<i>Never</i>	1.67	(1.17-2.37)**	0.94	(0.62-1.42)	1.27	(0.94-1.71)	1.15	(0.83-1.60)
<i>Parent Slept under same Roof</i>	<i>Ever</i>	1		1		1		1	
	<i>Never</i>	0.61	(0.43-0.87)**	0.90	(0.66-1.22)	0.96	(0.74-1.26)	0.80	(0.60-1.05)
<i>Parent Spent Money on Gift/Pocket Money</i>	<i>Ever</i>	1		1		1		1	
	<i>Never</i>	1.08	(0.78-1.51)	1.12	(0.77-1.62)	0.80	(0.60-1.06)	1.20	(0.81-1.76)
<i>Alcohol Use at Baseline</i>	<i>Yes n=457 (11.1%)</i>	1.79	(1.53-2.10)***	1.02	(0.75-1.39)	1.73	(1.45-2.06)***	1.06	(0.76-1.50)
<i>Cigarette Use at Baseline</i>	<i>Yes n=627 (15.3%)</i>	1.37	(1.16-1.62)***	2.95	(2.59-3.30)***	1.38	(1.14-1.66)**	2.86	(2.50-3.29)***
<i>Age</i>		1.02	(0.98-1.07)	0.92	(0.89-1.01)	1.04	(0.99-1.08)	0.94	(0.88-1.01)
<i>Gender</i>	<i>Male</i>	1.74	(1.41-2.14)***	1.76	(1.39-2.23)***	1.86	(1.49-2.32)***	1.84	(1.45-2.34)***
<i>Race</i>	<i>Black</i>	1		1		1		1	
	<i>Colored</i>	1.30	(1.01-1.68)*	3.16	(2.32-4.29)***	1.21	(0.93-1.58)	2.90	(2.09-4.02)***
	<i>White</i>	5.29	(3.41-8.23)***	1.96	(1.16-3.33)*	5.01	(3.17-7.91)***	1.64	(0.94-2.84)
<i>Education</i>	<i><high School</i>	0.88	(0.53-1.49)	1.47	(0.87-2.47)	0.83	(0.46-1.48)	1.23	(0.73-2.09)
<i>Household per capita Income</i>	<i>Highest</i>	1		1		1		1	
	<i>Mid-High</i>	1.07	(0.81-1.40)	1.31	(0.97-1.76)	1.12	(0.83-1.49)	1.30	(0.94-1.78)
	<i>Low-Mid</i>	1.08	(0.79-1.47)	1.55	(1.10-2.17)*	1.03	(0.74-1.44)	1.53	(1.07-2.19)*
	<i>Lowest</i>	0.92	(0.64-1.32)	1.16	(0.75-1.80)	0.78	(0.53-1.15)	1.04	(0.65-1.67)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

1.4 Discussion

We examined the longitudinal association between parental social support and the initiation of alcohol consumption and cigarette smoking among adolescents in South Africa. This study revealed four salient findings: 1.) adolescents who did not eat meals together with their mothers were more likely to initiate alcohol consumption compared to those adolescents who ate meals with their mothers, 2.) maternal social support appears to be a more important determinant of adolescent alcohol use initiation compared to paternal social support, 3.) adolescents whose mothers never slept under the same roof with them were less likely to initiate alcohol consumption compared to those whose mothers slept under the same roof with them, and 4.) prior cigarette smoking has a strong association with alcohol use initiation while prior alcohol drinking is not associated with cigarette smoking initiation.

Since eating meals together is one of the most frequent joint family activities (Garmienė, Žemaitienė, and Zaborskis 2006), regular family meals can engender closeness and rapport between adolescents and their parents. At the same time, it may provide an opportunity for more parental supervision and monitoring, while offering context for parents to share valuable information and connect with their children (Eisenberg et al. 2004). Moreover, time spent at family meals amounts to time spent away from negative peer influences while providing an opportunity for parents to assess the emotional well-being of their children. Our findings are consistent with results from a recent systematic review of the effects of family meal frequency on psychosocial outcomes among youth that reveals an inverse association between family meal frequency and use of cigarettes, alcohol, and marijuana (Harrison et al. 2015).

Moreover, our analyses indicate that non-receipt of social support from mothers has a statistically stronger association with the risk for onset of alcohol use compared to non-receipt

from fathers, and this aligns with our hypothesis and the findings from previous studies, which note that mothers, compared to fathers, were more likely to have a positive parent-child relationship (Coley, Votruba-Drzal, and Schindler 2008). Also, in South Africa, cultural and historical issues such as the migrant labor systems and job insecurity have led to flexible living arrangements where many fathers are not co-resident with their children compared to the mothers (Clark, Cotton, and Marteleto 2015). The physical and emotional closeness with mothers potentially enhances the bonding between the mothers and their children and consequently engenders trust, and reduces parent-child conflicts. As a result, young people are more likely to turn to their mothers for information and guidance, which may influence their decisions to initiate or delay substance use (Maslowsky et al. 2015).

Our findings also indicate that young adults whose mothers never slept under the same roof with them were less likely to initiate alcohol consumption compared to those young adults whose mothers always slept under the same roof with them. This finding is contrary to our hypothesis. We explored possible differential effects; the observed effect does not differ according to age categories, sex or race (effect modification). Our analyses also indicate this finding could not be due to presence of fathers in the household as only 2.3% of the young adults who reported that their mother did not spend the night, said that their fathers spent the night; compared to 237 (7.2%) who reported that both parents did not spend the night under the same roof with them. Since this finding is inconsistent with our hypothesis and previous studies which found an association between adolescent risky behaviors and parents not sleeping under the same roof (Li et al. 2014), more research is required in South Africa to unravel and understand this paradoxical finding.

Our findings indicate that prior cigarette smoking is strongly associated with initiation of alcohol drinking, but prior alcohol drinking is not associated with cigarette smoking initiation. This finding conforms with previous research which shows that cigarettes are a gateway drug for alcohol use (Chen et al. 2002). This finding also seems logical given that there was a higher prevalence of cigarette smoking compared to alcohol drinking at different ages, and that significant increase in cigarette smoking occurred earlier at 16 years compared to that of alcohol drinking which occurred at 17 years among our participants (data not shown). This strong association is not necessarily causal (Chen et al. 2002) and other studies concluded that alcohol was a gateway drug for other drug use, including cigarettes (Kelley, Denny, and Young 1999), contrary to our findings.

1.5 Strengths and Weaknesses

One of the strengths of our study is that it employed longitudinal data, comparing the same adolescents at two time periods, to explore the impact of parental social support at baseline (2002) on the onset of substance use at follow-up (2005). Since this longitudinal analysis spanned three years where the exposures preceded the outcomes, our study is better suited to predict the longitudinal or causal associations between parental support and substance use initiation compared to cross-sectional studies.

Some important limitations should be considered when interpreting and weighing the results of our study. The data used for this analysis were collected in two waves with a three year interval between them. Given that the relationship between parental social support and substance use might be variable over time, this relatively long interval between waves, and attrition of respondents between the waves may result in bias. Our study utilized only two waves of data for

the analysis. A dataset with longer follow-up period would have been better given that social support is a dynamic interactive process.

1.6 Conclusion

The analysis of the panel data of over 4,000 adolescents aged 14-22 year suggests that there is a complex relationship between parental social support and onset of substance use among youth in South Africa. Despite the limitations, our findings highlight the protective roles of eating family meals together, especially with mothers, on adolescent alcohol consumption initiation. The strength of the impact of frequent family meals may not be limited to only substance use, but also include other youth risk behaviors (Eisenberg et al. 2004) and it underscores the need for future research on the different mechanisms through which family meals influence adolescent behaviors using longitudinal studies. These findings would assist in the design and implementation of evidence-based, family-centered interventions to counter peer influences and change adolescent health behaviors and outcomes. Also, further studies are needed to unravel the unexpected finding of the apparent protective effect of mothers not sleeping under the same roof.

1.7 Implications and Contributions:

Our findings reveal gaps in the understanding of the complex associations between parental social support and adolescent substance use in South Africa while adding to the extant body of knowledge. This underscores the need for further research on the different mechanisms through which frequent family meals influence adolescent substance use.

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Paper 2:

Adolescent Sexual Behavior in South Africa: How Important is Parental Social Support?

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2 Abstract

CONTEXT: Engagement in risky sexual behavior exposes adolescents to increased risk of sexually transmitted infections. Parental social support is associated with reduced risk of adolescent dangerous sexual behavior, but this association has not been adequately investigated among adolescents in South Africa.

METHODS: We used data from Waves 1 and 3 of the Cape Area Panel Study (CAPS) young adult questionnaire, a longitudinal study of over 4,000 youth aged 14-22 years and living in Cape Town. We used logistic regression to investigate the associations between parental social support and adolescent risky sexual behavior in South Africa.

RESULTS: Overall, 19% of the adolescents initiated sexual activity before the age of 16; almost 48% reported multiple sexual partners and about 29% engaged in unprotected sex at their first sexual encounter. There were increased risks of multiple sexual partnerships among adolescents who never ate meals with their mothers (RR=1.63, 95%CI: 1.10-2.43), and among those who never discussed personal matters with their fathers (RR=1.32, 95% CI: 1.04-1.67). Also, adolescents who never got money for gifts or pocket money from their mothers were more likely to engage in unprotected sex during their first sexual encounter compared to those who got money from their mothers (RR=1.38, 95% CI: 1.02-1.87).

CONCLUSIONS: Parental social support, especially eating family meals, discussing personal matters with youth, and providing them with pocket money or gifts, may protect adolescents in South Africa from risky sexual behavior. These findings call for more research on the different mechanisms through which parental support influences adolescent behavior.

2.1 Introduction

Adolescent engagement in risky sexual behavior, such as early sexual debut before age 16, having multiple sexual partners or unprotected sex is a major public health issue. Studies demonstrate that risky sexual behaviors place adolescents at higher risk for sexually transmitted infections such as gonorrhea, chlamydia, HIV, human papillomavirus and cervical cancer (Dir, Coskunpinar, and Cyders 2014; Marston et al. 2013). Risky sexual behaviors are also associated with high risk for unintended pregnancy and psychosocial problems (Madkour et al. 2010). It has been shown that age at sexual debut is the most critical sexual behavior since adolescents who initiate sexual intercourse at younger ages are more likely than those who do not engage in early sexual debut to engage in other risky sexual behaviors and are also disproportionately affected by poor reproductive health outcomes (Edgardh 2000; Kaplan et al. 2013; O'Donnell, O'Donnell, and Stueve 2001; Marston et al. 2013).

Several factors work across multiple levels of influence in a complex manner to shape adolescent sexual behavior (Kotchick et al. 2001). Consequently, a proper articulation and understanding of the determinants of adolescent risky sexual behaviors require a multisystem perspective. For this study, we were guided by Bronfenbrenner's social-ecological theory. The social-ecological models of health behavior postulate that multiple levels of contextual factors influence health behavior, at the same time these factors interact with each other across levels (Bronfenbrenner 1986; Glanz et al. 2008; Stokols 1996; Sallis, Owen, and Fisher 2008).

A few broad categories of predictors of adolescent risk sexual behaviors at the individual, interpersonal, family, community and societal levels include: personal factors (e.g., race/ethnicity, socioeconomic status, knowledge/attitudes about safe sexual practices),

psychosocial factors (e.g., emotional/behavioral problems, substance use, peer influences, gender roles), familial factors (e.g., parental support and supervision, sibling influences, family conflicts), religious and cultural factors (e.g., religious group membership/participation, cultural norms on sexual practices) (Bachanas et al. 2002; Kalmuss et al. 2003; Lee, Cintron, and Kocher 2014; Lee et al. 2013). Specifically, predictors of early sexual debut in Sub-Saharan Africa (SSA) include substance use, delinquency and poor parental supervision for boys; and substance use, mental distress, poor economic status, and poor parental connectedness for girls (Peltzer 2010; McGrath et al. 2009; Tenkorang, Rajulton, and Maticka-Tyndale 2009a).

The family is the most influential microsystem within the social-ecological framework of child development (Perrino et al. 2000). Parents play critical roles in the sexual socialization and sex role development of children that last well into adulthood (Shtarkshall, Santelli, and Hirsch 2007; Witt 1997). Sex roles are a set of behavioral expectations that parents hold about the attributes, characteristics, and behaviors appropriate for their children by their gender. Parents shape their children's sexual awareness and adult sex roles by emphasizing their behavioral expectations and values, shared cultural beliefs and codes of conduct regarding sexual behaviors and expressions. Parents do this through implicit and explicit messages, role modeling, and actions (Shtarkshall, Santelli, and Hirsch 2007; Weinraub et al. 1984). Parental social support and connectedness are the most critical processes through which parents influence the social development (e.g., self-concept and self-esteem) of their children (Hernandez, Rodriguez, and Spirito 2015; Richards et al. 1991).

Studies on theories of risky sexual behavior have shown that parental social support/connectedness impacts adolescent sexual behavior by its influences on mediators such as adolescents' attitudes and beliefs towards sexual behavior, mental health, impulse control,

academic and prosocial activities, substance use, and affiliation with sexually active peers (Simons et al. 2016; Miller, Benson, and Galbraith 2001). Adolescents with unsupportive parents, compared to those with supportive parents, were more likely to report substance use and depressed mood, which in turn are associated with affiliation with sexually active friends and permissive sexual attitudes and risky sexual behaviors (Miller, Benson, and Galbraith 2001). It has been theorized that poor parental connectedness creates a void that is filled by more intensive association with sexually active friends. At the same time, adolescents that lack parental closeness and warmth would be more susceptible to influences by peers on sexual activity (Miller, Benson, and Galbraith 2001). Finally, supportive parental relationships provide adolescents with a sense of belonging and self-worth, opportunities to develop interpersonal prosocial skills and self-regulation, and modify their beliefs and attitudes to sexual behavior (Miller, Benson, and Galbraith 2001; Parkes et al. 2011).

Several studies have investigated the impact of different parenting processes such as parental monitoring and supervision, parental communication and parenting styles, on adolescents' involvement in risky sexual behaviors (Guilamo-Ramos et al. 2012). Some studies have found an inverse association between parental supervision alone (Cohen et al. 2002; DiClemente, Wingood, Crosby, Sionean, et al. 2001; Li, Stanton, and Feigelman 2000; Dittus et al. 2015) or between parental supervision combined with communication (Biddlecom, Awusabo-Asare, and Bankole 2009; DeVore and Ginsburg 2005; Yang et al. 2007) and adolescent risk sexual behaviors. However, most of these studies were conducted in developed nations and were mostly cross-sectional studies.

Few studies have explored the protective effects of family connectedness and parental social support on adolescent risky sexual behaviors (Parkes et al. 2011; Markham et al. 2010;

Newman et al. 2008; Rose et al. 2005; Sieving, McNeely, and Blum 2000; Velez-Pastrana, Gonzalez-Rodriguez, and Borges-Hernandez 2005). Even fewer studies were conducted in SSA on the relationship between parental communication and parental monitoring and adolescent risky sexual behaviors. Most of these studies showed mixed findings (Bastien, Kajula, and Muhwezi 2011; Biddlecom, Awusabo-Asare, and Bankole 2009; Okigbo et al. 2015; Sidze et al. 2015) about the positive role of social support?

Extant research demonstrates that young age at first sex is a risk factor for HIV infection especially among girls in SSA (Stockl et al. 2013). Rates of new HIV infections remain the highest in SSA especially among adolescents aged 15-24 years despite reductions in global HIV prevalence (Toska et al. 2017). South Africa has the largest HIV epidemic in the world with over 270, 000 new HIV infections in 2016, representing 15% of global new infections for that year, and over a quarter of these new infections occurred among those aged 15-24 years with girls being eight times more likely to be infected compared to boys (Shisana et al. 2014). A range of socioeconomic and cultural norms (e.g. gender inequality, low status of women in society, early marriage and low levels of education) which lead to earlier sexual debut by females underpin the disproportionately higher incidence of HIV among adolescent girls compared to boys in SSA. Early sexual debut potentially increases HIV risk for women because such women have extended duration of exposure to HIV infection risk, are more likely to engage in risky sexual behavior (e.g., lower contraception and condom use, multiple, older sexual partners through transactional sex, higher risks of forced sex and sex while drunk), are more likely to have reproductive tracts that are physiologically and immunologically immature, and their partners are more likely to have higher risk of being HIV positive given their older age and longer duration of exposure

(Stockl et al. 2013; Doyle et al. 2012; Pettifor et al. 2009; O'Donnell, O'Donnell, and Stueve 2001).

These troubling statistics call for better understanding of the psychosocial and behavioral determinants of adolescent risky sexual behavior in SSA, in general, and South Africa, in particular. It is imperative to understand this relationship in this context to inform the design of culturally appropriate sexual and reproductive health interventions for this group, over and above the comprehensive interventions for the population at large. Empirical evidence, however, suggests that direct parental involvement in the sexual socialization of children has been minimal in most SSA countries (Bastien, Kajula, and Muhwezi 2011). Only one study, to our knowledge, has explored the longitudinal association between parental social support and adolescents risky sexual behaviors in South Africa in (Camlin and Snow 2008).

There are still major knowledge gaps in the association between parental social support and adolescent risky sexual behavior, especially in developing countries. These gaps are due to the mixed findings from the limited number of studies in SSA on this important association. Also, very few studies explored the differential effects of maternal vs. paternal support, or the type of parental support (e.g. emotional, appraisal, and instrumental support) on adolescent girls and boys risky sexual behavior. The previous studies that have explored the differential maternal and paternal influences on sexual behavior yielded heterogeneous findings (Kalina et al. 2013). Hence, it is unclear which types of parental support are more likely to impact adolescent sexual behavior.

To address these gaps, we conducted a study utilizing a longitudinal panel data (2002 – 2005) of 4,121 adolescents in South Africa, aged 14 – 22 years to investigate: (1) if lack of specific categories of parental social support (i.e., emotional, appraisal and instrumental

supports) (Camlin and Snow 2008) are associated with higher risk of dangerous sexual behaviors by adolescents, (2) and whether there are differential impacts of maternal vs. paternal support on adolescent risky sexual behaviors. The aims of this study, therefore, were to investigate the longitudinal associations between parental social support (maternal and paternal) and adolescent risky sexual behavior in South Africa. We hypothesize that adolescents who received no social support from their parents would be more likely to engage in risky sexual behaviors compared to those that received some support. Informed by the research literature, we also hypothesize that maternal social support would be more protective of engagement in risky sexual behaviors among male adolescents compared to paternal support; and that paternal support would be more protective for female adolescents (i.e., cross-gender effects) (Okigbo et al. 2015; Kalina et al. 2013; Lenciauskiene and Zaborskis 2008; Coley, Votruba-Drzal, and Schindler 2009; Rodgers 1999).

2.2 Methods

2.2.1 Data Collection

This study uses data from Wave 1 (2002) and Wave 3 (2005) of the Cape Area Panel Study (CAPS) young adult questionnaire, a longitudinal study of adolescents and young adults aged 14-22 years and living in the Cape Town metropolitan area. Eligibility criteria for the young adult sample include being a member of a randomly selected household in the selected enumeration areas, and at least 14 years old at the time of interview. The sampling design, methods and population characteristics of CAPS have been discussed in detail elsewhere (Lam, Marteleto, and Ranchhod 2013; Tenkorang, Maticka-Tyndale, and Rajulton 2011; Tibesigwa and Visser 2014; Anderson, Beutel, and Maughan-Brown 2007; Beauclair et al. 2012; Camlin and Snow 2008; Dinkelman, Lam, and Leibbrandt 2007; Lam et al. 2008; Tenkorang, Rajulton, and

Maticka-Tyndale 2009b). CAPS used a stratified multistage sampling design to select the participants for the study, first selecting enumeration areas (EA) used in the 1996 South African Census as the primary sampling units (PSUs) and then using households within each EA as the secondary sampling units. The design also used population characteristics of enumeration areas to oversample Black and White participants to generate an approximately equal sample of each racial and ethnic group (Black African, White, and Colored/Biracial). Overall, 4,752 participants were surveyed in 2002 (wave 1), and follow-up data were available for 3,536 (74.4%) in 2005 (wave 3). Wave 2 (2003/2004) does not have data on risky sexual behaviors and parental support which are the primary variables of interest in this present study. The eligible analytic sample for the current analysis included 2,542 respondents who responded to the Wave 2 survey and who had not initiated sexual activity at baseline in 2002 (wave 1). The Harvard T. H. Chan School of Public Health IRB committee reviewed and approved the exempt status of our research.

2.2.2 Dependent variables

The wave 3 of the CAPS included items about sexual activity. The respondents were asked if they have ever had sex. Those who responded “yes” to this question were asked follow-up questions that included: (1.) *“At what age did you first have sexual intercourse, meaning full penetration?”* We dichotomized the age at first sex into “early sexual debut” if age at first sex was before 16 years and “non-early sexual debut” if age at first sex is at or after 16 years. Different investigators have defined early sexual debut as sexual intercourse at or before age 14 (Baumgartner et al. 2009; Crockett et al. 1996), at or before age 16 (Madkour et al. 2010), at or before age 18 (Marston et al. 2013). In this study, we defined early sexual debut as sex before age 16, based on the strong association between sex before this age and negative health and psychosocial outcomes (Darroch, Singh, and Frost 2001; Spriggs and Halpern 2008; O'Donnell,

O'Donnell, and Stueve 2001), and statistical distribution of age at first intercourse in South Africa (Stockl et al. 2013; Eaton, Flisher, and Aaro 2003; Harrison et al. 2005). Also, because prior studies in other places such as France (Godeau et al. 2008), Sweden (Magnusson 1998), Finland (Lavikainen, Lintonen, and Kosunen 2009) and the Britain (Wellings et al. 2001) adopted this criterion. (2.) *“The very first time you had sex, did you or the other person use any methods to prevent pregnancy or sexually transmitted disease?”* Each respondent's answer to this question was coded as "1" if he/she answered “no” (unprotected sex) and “0” if he/she answered “yes” (protected sex). (3.) *“With how many different people have you had sexual intercourse in your whole life?”* We also dichotomized each respondent's answer into "multiple sexual partnerships" if the response was two or more partners and "monogamous sexual partnership" if the response was one partner (Tibesigwa and Visser 2014).

2.2.3 Independent variables

Five items were included in the CAPS survey to capture the different domains (emotional, appraisal and instrumental) of parental social support. Each item on both maternal and paternal support has a set of eight response categories for frequency of occurrence of each type of social support ranging from daily or almost daily to once a week to once or twice a year to never. We constructed dichotomous values of “never” versus “ever” from these eight responses. Each respondent's answers to each question on maternal and paternal supports were coded as "1" if he/she answered “never” and “0” if he/she answered “ever.” All the independent variables used in our analyses were measured at wave 1 (2002) to ensure that they preceded adolescent risky sexual behaviors at wave 3 (2005).

2.2.3.1 *Maternal Social Support*

Maternal social support was assessed by asking the following questions: (1) How often has your mother spent time with just you in the past 12 months? (2) How often has your mother discussed personal matters with you in the past 12 months? (3) How often has your mother eaten meals with you over the past 12 months? (4) How often has your mother given you pocket money or money for gifts, clothes in the past 12 months? Each of these questions was treated as binary variables (never vs. ever) and modeled as independent variables in the multivariable logistic regression model. A previous study has shown that these items achieved factor loadings of 0.65 or higher onto three domains of parental social support: intimacy with parents (emotional support), lifetime parental co-residence (appraisal support), and financial support (instrumental support) (Camlin and Snow 2008).

2.2.3.2 *Paternal Social Support*

Paternal social support was assessed by asking the same questions as for maternal social support above.

2.2.4 *Confounders*

The sociodemographic variables included in our analyses were measured at wave 1 (2002) and they include the following: Age (Continuous), Sex (Female/Male), Race (Black/Colored/White), Education (High School or more/Less than high school), and Household per Capita income, in quartiles (Lowest/Low-middle/Middle-higher/Highest). Age was stratified into two categories (14-17 years, and 18-22 years) for descriptive purposes (see table 1) and employed as a continuous variable in all analyses. The other racial groups in Cape Town, including Asians, were excluded from the analyses because of very few numbers of young adults in this category. The household per capita income was derived by adding up all the monthly

household income and dividing the total by the number of people in the household (Camlin and Snow 2008). We also controlled for the area of Residence (Rural vs. Urban) of the adolescents. It has been shown that sexual behavior is riskier in rural than urban areas because urban youth have more access to sexual and reproductive health information and are, therefore, better informed than their rural counterparts (Eaton, Flisher, and Aaro 2003; Voeten, Egesah, and Habbema 2004; Zambuko and Mturi 2005). Also, adolescents residing in rural areas may experience more social connections within their families (e.g., shared family meals) compared to their peers resident in urban areas (US Department of Health and Human Services 2015; Radcliff, Crouch, and Strompolis 2018).

2.2.5 Statistical analysis

All analyses were conducted using STATA version 12 SE (StataCorp 2011). The appropriate sampling weights were applied to the dataset during the analysis to account for the critical elements of the cluster sampling design – including the oversampling of Black and White households, a differential sampling of households with and without young adult members, etc. (Lam et al. 2008). Descriptive statistics were used to examine the characteristics of the study sample in wave 1 and wave 3. Chi-square test was used to compare the sociodemographic variables of the samples at both waves, and this showed that there were no statistically significant changes in the time-invariant demographic variables such as gender and race due to attrition and non-responses (data not shown). We then estimated the bivariate relationship between the sociodemographic variables (wave 1) and adolescent risky sexual behavior (wave 3) using chi-square test (Table 2.1). The distributions of parental social support according to the source of support (i.e., maternal vs. paternal support), race and sex of the adolescents at wave 1 were shown in Table 2.2.

Furthermore, multivariable logistic regression analyses were conducted to examine the association between each of the types of maternal and paternal social supports in 2002 (wave 1) and each of the adolescent risky sexual behavior in 2005 (wave 3) using the logit link function in STATA (Table 2.3). The risk ratio (RR) and the 95% confidence intervals (CI) were derived in each case. All the effect estimates were expressed as risk ratios (RR) instead of odds ratios (OR) because of the high prevalence of risky sexual behavior (>10%) among our study population. The rare disease assumption required by odds ratios have been violated, and the adjusted odds ratios derived from the logistic regression can no longer approximate the risk ratios (Zhang and Kai 1998). We conducted three multivariable regression models to estimate the unadjusted, adjusted and interaction associations of each type of parental social supports and adolescent risky sexual behavior. In model 1, we estimated the crude associations of types of parental social support and each sexual behavior separately for maternal and paternal support. In model 2, we adjusted for the sociodemographic variables (Table 2.3).

Finally, we specified interaction terms to test effect measure modification of the association of parental social support and adolescent risky sexual behaviors by age categories, sex, and race in model 3. The tables for the results of model 1 and model 3 were not shown here since the interaction terms were not statistically significant.

2.3 Results

2.3.1 Socio-demographic characteristics according to adolescent risky sexual behaviors

Table 2.1 presents the sociodemographic characteristics of the adolescents who had not initiated sexual activity at wave 1 (2002) stratified according to early sexual debut, multiple partnerships, and unprotected sex at first sex at wave 3 (2005). The mean age of the participants

was 16.6 (SD 2.2) years at wave 1. About 69% of them were aged 16-17 years. Almost 55% of the participants were females, and the majority were Colored (51%) compared to Blacks (32%) and Whites (16%). A little more than half of the adolescents have completed high school or more education (52%), and a majority of them (79%) lived in urban areas. A large proportion of the adolescents belonged to households with per capita income in the highest (36%), and middle-higher (25%) income ranges compared to the low-middle (21%) and lowest (19%) income ranges.

Table 2.1 also shows that about 19% of the adolescents initiated sexual activity before the age of 16; almost 48% reported multiple sexual partners and about 29% engaged in unprotected sex at their first sexual encounter between wave 1 and wave 3. The younger participants (16 – 17 years) were more likely to initiate sex early compared to the older participants (22% vs. 12%, $p=0.001$). Higher proportions of males compared to females engaged in early debut (27% vs. 13%, $p<0.001$), and multiple partnerships (60% vs. 38%, $p<0.001$) at wave 3. However, more females compared to males had unprotected sex during their first sexual encounter (30% vs. 27%, $p=0.001$) at wave 3. Black participants were most likely to engage in early sexual debut (27%) compared to Colored (14%) and White (8%) participants ($p<0.001$), and multiple partnerships (59%) compared to White (47%) and Colored (37%) participants ($p<0.001$). Colored participants were more likely to engage in unprotected sex during the first sexual encounter (34%) compared to Black (27%) and White (9%) participants ($p<0.001$).

Table 2.1: Socio-demographic Characteristics of the Young Adults who have not Initiated Sexual Activity at wave 1 (2002) Stratified according to Early Sexual Debut, Multiple Sexual Partnerships, and Unprotected Sex at First Sex, at Wave 3 (2005)

N=2,542

Socio-demographic Characteristics (2002)				Risky Sexual Behaviors (2005)								
		Total		Early Sexual Debut N=746			Multiple Sexual Partnership N=838			Unprotected Sex at First Sex N=815		
		<i>n</i> (%)	Mean (SD)	Yes <i>n</i> (%)	Total <i>n</i>	Chi-Sq. <i>X</i> ²	Yes <i>n</i> (%)	Total <i>n</i>	Chi-Sq. <i>X</i> ²	Yes <i>n</i> (%)	Total <i>n</i>	Chi-Sq. <i>X</i> ²
Age (continuous)		2,542 (100)	16.6 (2.2)									
Age (categories)	Younger (16-17)	1,752 (68.9)		115 (22.2)	519		277 (49.7)	557		149 (27.1)	550	
	Older (18-22)	790 (31.1)		27 (11.9)	227		121 (43.1)	281		84 (31.7)	265	
	Total	2,542		142 (19.0)	746	10.8**	398 (47.5)	838	3.33	233 (28.6)	815	0.64
Sex	Female	1,395 (54.9)		54 (12.9)	419		176 (37.5)	469		136 (30.0)	454	
	Male	1,147 (45.1)		88 (26.9)	327		222 (60.2)	369		97 (26.9)	361	
	Total	2,542		142 (19.0)	746	23.4***	398 (47.5)	838	42.4***	233 (28.6)	815	11.6**
Race	Black	823 (32.4)		87 (27.1)	321		216 (59.3)	364		92 (26.5)	347	
	Colored	1,303 (51.3)		49 (13.9)	352		144 (36.6)	393		134 (34.3)	391	
	White	416 (16.4)		6 (8.2)	73		38 (46.9)	81		7 (9.1)	77	
	Total	2,542		142 (19.0)	746	25.1***	398 (47.5)	838	39.1***	233 (28.6)	815	42.2** *
Education	High School or More	1,325 (52.2)		48 (12.3)	391		198 (43.3)	457		112 (25.6)	438	
	Less than High School	1,214 (47.8)		94 (26.5)	355		200 (52.5)	381		121 (32.1)	377	
	Total	2,539		142 (19.0)	746	24.4***	398 (47.5)	838	7.00**	233 (28.6)	815	0.003
Residence	Rural	522 (20.7)		50 (26.5)	189		121 (55.5)	218		50 (23.7)	211	
	Urban	1,996 (79.3)		90 (16.3)	552		271 (44.3)	612		178 (31.0)	574	
	Total	2,518		140 (18.9)	741	9.47**	392 (47.2)	830	8.12**	228 (29.0)	785	4.00*
Household per capita Income (in quartiles)	Lowest Income (R0-R233/month)	473 (18.6)		51 (29.1)	175		110 (59.5)	185		57 (30.3)	188	
	Low-Middle Income (R234-R467/month)	532 (20.9)		42 (20.9)	201		119 (51.7)	230		67 (30.5)	220	
	Middle-Higher Inc. (R468-R989/month)	625 (24.6)		31 (16.8)	185		82 (38.1)	215		63 (31.7)	199	
	Highest Income (R990-R27,810)	909 (35.8)		18 (9.7)	185		87 (41.8)	208		46 (24.9)	185	
	Total	2,539		142 (19.0)	746	23.1***	398 (47.5)	838	22.5***	233 (29.4)	792	2.52

Notes: 3 cases (0.12%) missing education, 24 cases (0.94%) missing place of residence, 3 cases (0.12%) missing household per capita income

2.3.2 Distribution of parental social support at wave 1 (2002)

Table 2.2 presents the distributions of parental social support at baseline according to the source of the support (maternal vs. paternal), race and sex of the young adult. Receipt of social support differed by the sex of the parents. The proportion of adolescents who did not receive social support from their mothers ranged from 5.6% to 24% while the range of paternal non-support ranged from 26% to 50% ($p < 0.001$ for maternal/paternal differences). Greater proportions of Black adolescents reported non-receipt of parental social support compared to the White adolescents who reported the least proportions. The proportions of the Colored adolescents lie between that of the Blacks and Whites ($p < 0.001$). Overall, there are no differences in the distribution of maternal and paternal social support according to the sex of the adolescents except for "*spending time*" and "*discussing personal matters*" together. More female adolescents reported that they spent time together and discussed personal matters with their fathers compared to their mothers ($p = 0.036$ and $p < 0.001$); while more male adolescents reported that they spent time together and discussed personal matters with their mothers compared to their fathers ($p = 0.043$ and $p = 0.029$ respectively).

Table 2.2: Distribution of Parental Social Support according to the Source of Support (Maternal vs Paternal), Race and Sex of Young Adult at wave 1 (2002)

N=2,542

			<i>Independent Variables at Wave 1 (2002)</i>							
			Parent Spent Time with Young Adult		Parent Discussed Personal Matters with Young Adult		Parent Ate Meals together with Young Adult		Parent Spent Money on Gift/Pocket Money	
			<i>Never n (%)</i>	<i>Total n</i>	<i>Never n (%)</i>	<i>Total N</i>	<i>Never n (%)</i>	<i>Total n</i>	<i>Never n (%)</i>	<i>Total n</i>
Source of Parental Social Support	Mother		277 (11.6)	2,402	567 (23.7)	2,395	136 (5.6)	2,414	261 (10.9)	2,395
	Father		731 (33.1)	2,212	1,107 (50.2)	2,204	578 (26.1)	2,218	649 (29.7)	2,188
	Pearson Chi-square	t-statistic	19.9***		27.0***		20.8***		17.2***	
Maternal Support	Race	Black	101 (13.3)	758	224 (29.6)	757	64 (8.4)	761	130 (17.2)	757
		Colored	150 (12.1)	1,239	303 (24.5)	1,237	61 (4.9)	1,243	112 (9.1)	1,232
		White	26 (6.4)	405	40 (10.0)	401	11 (2.7)	410	19 (4.7)	406
	Pearson Chi-square	t-statistic	13.2**		56.8***		19.0***		51.0***	
	Sex	Female	140 (10.7)	1,313	287 (21.9)	1,308	82 (6.2)	1,322	142 (10.8)	1,311
		Male	137 (12.6)	1,089	280 (25.8)	1,087	54 (5.0)	1,092	119 (11.0)	1,084
	Pearson Chi-square	t-statistic	4.16*		4.79*		1.78		0.013	
Paternal Support	Race	Black	265 (40.3)	658	378 (57.7)	655	223 (34.0)	656	266 (41.2)	645
		Colored	408 (35.1)	1,161	634 (54.8)	1,156	316 (27.2)	1,163	344 (30.0)	1,147
		White	58 (14.8)	393	95 (24.2)	393	39 (9.8)	399	39 (9.9)	396
	Pearson Chi-square	t-statistic	77.2***		131.2** *		77.1***		116.0***	
	Sex	Female	424 (35.0)	1,213	659 (54.6)	1,208	336 (27.6)	1,217	376 (31.4)	1,199
		Male	307 (30.7)	999	448 (45.0)	996	242 (24.2)	1,001	273 (27.6)	989
	Pearson Chi-square	t-statistic	4.42*		20.01** *		3.36		3.66	

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

2.3.3 Multivariable logistic regression of the association between parental social support at baseline (2002) and early sexual debut at follow-up (2005)

Table 2.3 shows the results of multivariable models estimating associations between parental social support in 2002 (baseline), and early sexual debut in 2005 (follow-up) adjusted for sociodemographic variables at baseline. Adolescents who never ate meals together with their mothers at baseline have an increased risk of early sexual debut at follow-up compared to young adults who ate meals together with their mothers at baseline (RR=1.96, 95% CI:0.93-4.15).

There were no significant relationships between mothers spending time together or discussing personal matters with the young adults, or spending money on gifts/pocket money for the young adult at baseline and early sexual debut by the young adults at follow-up. Also, there were no significant associations between any types of paternal social support and adolescent early sexual debut.

2.3.4 Multivariable logistic regression of the association between parental social support at baseline (2002) and multiple sexual partnerships at follow-up (2005)

Table 2.3, also shows the results of multivariable models estimating associations between parental social support in 2002 (baseline), and multiple sexual partnerships in 2005 (follow-up) adjusted for sociodemographic variables at baseline. Adolescents who never ate meals together with their mothers at baseline have a statistically significant increase in the risk of multiple sexual partnerships at follow-up compared to adolescents who ate meals together with their mothers at baseline (RR=1.63, 95% CI:1.10-2.43). Also, adolescents who never discussed personal matters with their fathers at baseline have a statistically significant increase in the risk of multiple sexual partnerships at follow-up compared to adolescents who discussed personal matters with their fathers at baseline (RR=1.32, 95%CI:1.04-1.67).

The other types of maternal and paternal supports do not have any significant statistical associations with multiple sexual partnerships.

2.3.5 Multivariable logistic regression of the association between parental social support at baseline (2002) and unprotected sex during the first sexual encounter at follow-up (2005)

Finally, table 2.3 shows the results of multivariable models estimating associations between parental social support in 2002 (baseline), and unprotected sex during their first sexual encounter in 2005 (follow-up) adjusted for sociodemographic variables at baseline. Adolescents who never received money for gifts and pocket money from their mothers at baseline have a statistically significant increase in the risk of unprotected sex during their first sexual encounter at follow-up compared to those who received money from their mothers (RR=1.38, 95% CI: 1.02-1.87). There are no significant statistical associations between other types of parental social support and unprotected sex.

Finally, further analyses reveal that the beta estimates for effect measure modification of the relationship between parental social support and risky sexual behavior by age categories, gender or race were not statistically significant (results not shown).

Table 2.3: Multivariable Logistic Regression of the association between Maternal and Paternal Social Supports in 2002 and Risky Sexual Behaviors in 2005

		Maternal				Paternal		
		Early Sexual Debut (2005)	Multiple Sexual Partnership (2005)	Unprotected Sex at First Sex (2005)		Early Sexual Debut (2005)	Multiple Sexual Partnership (2005)	Unprotected Sex at First Sex (2005)
Independent Variables Wave1 (2002)		RR (95% CI)	RR (95% CI)	RR (95% CI)		RR (95% CI)	RR (95% CI)	RR (95% CI)
<i>Parent Spent Time with Young Adult</i>	<i>Ever</i>	1	1	1		1	1	1
	<i>Never</i>	0.90 (0.47-1.74)	0.93 (0.66-1.30)	1.05 (0.63-1.74)		1.61 (0.96-2.70)	0.93 (0.67-1.28)	1.12 (0.75-1.67)
<i>Parent Ate Meals together with Young Adult</i>	<i>Ever</i>	1	1	1		1	1	1
	<i>Never</i>	1.96 (0.93-4.15)	1.63* (1.10-2.43)	0.64 (0.28-1.46)		0.93 (0.53-1.61)	0.96 (0.70-1.32)	0.78 (0.57-1.11)
<i>Parent Discussed Personal Matters with Young Adult</i>	<i>Ever</i>	1	1	1		1	1	1
	<i>Never</i>	1.25 (0.73-2.13)	1.17 (0.95-1.43)	1.11 (0.81-1.52)		0.86 (0.53-1.39)	1.32* (1.04-1.67)	1.15 (0.85-1.55)
<i>Parent Spent Money on Gift/Pocket Money</i>	<i>Ever</i>	1	1	1		1	1	1
	<i>Never</i>	0.92 (0.51-1.64)	0.85 (0.63-1.14)	1.38* (1.02-1.87)		1.11 (0.71-1.73)	0.93 (0.73-1.19)	1.28 (0.90-1.82)
<i>Age</i>		0.82** (0.72-0.95)	0.96 (0.91-1.03)	1.07* (1.00-1.14)		0.81** (0.62-0.94)	0.96 (0.91-1.01)	1.10* (1.02-1.19)
<i>Sex</i>	<i>Male</i>	2.00** (1.35-2.96)	1.84*** (1.52-2.21)	0.66** (0.52-0.84)		2.14** (1.38-3.32)	1.84*** (1.52-2.23)	0.65** (0.50-0.86)
<i>Race</i>	<i>Black</i>	1	1	1		1	1	1
	<i>Colored</i>	0.71 (0.44-1.15)	0.65*** (0.54-0.77)	2.53*** (1.78-3.60)		0.77 (0.44-1.31)	0.67*** (0.55-0.81)	2.51*** (1.70-3.72)
	<i>White</i>	0.40 (0.11-1.41)	0.69 (0.46-1.03)	1.45 (0.64-3.29)		0.42 (0.11-1.61)	0.75 (0.49-1.13)	1.54 (0.63-3.75)
<i>Education</i>	<i><high School</i>	1.01 (0.64-1.59)	0.97 (0.79-1.19)	1.21 (0.94-1.57)		0.96 (0.60-1.55)	0.94 (0.77-1.15)	1.24 (0.93-1.65)
<i>Residence</i>	<i>Rural</i>	1.30 (0.75-2.25)	0.93 (0.76-1.14)	1.28 (0.90-1.81)		1.68 (0.94-3.03)	1.01 (0.81-1.25)	1.30 (0.87-1.94)
<i>Household per capita Income (in quartiles)</i>	<i>Highest</i>	1	1	1	1	1	1	1
	<i>Mid-High</i>	1.22 (0.61-2.43)	0.76 (0.57-1.01)	1.31 (0.89-1.92)		1.15 (0.55-2.39)	0.79 (0.59-1.07)	1.35 (0.87-2.08)
	<i>Low-Mid</i>	1.28 (0.63-2.61)	0.96 (0.73-1.26)	1.38 (0.92-2.05)		1.13 (0.53-2.41)	0.96 (0.74-1.25)	1.56* (1.01-2.40)
	<i>Lowest</i>	1.50 (0.74-3.06)	1.10 (0.83-1.45)	1.76 (1.21-2.57)		1.31 (0.60-2.89)	1.11 (0.84-1.46)	1.75** (1.15-2.65)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2.4 Discussion

We investigated the association between parental social support and risky sexual behavior (early sexual debut, multiple sexual partners, and unprotected sex at first sexual encounter) among adolescents in South Africa. This study revealed four salient findings: (1) adolescents who did not eat meals together with their mothers were more likely to initiate sexual activity earlier, and have multiple sexual partners compared to those young adults who ate meals with their mothers, (2) those that did not receive monetary gifts from their mothers were more likely to engage in unprotected sex compared to those that did, (3) maternal social supports are found to be more important determinants of adolescent sexual behaviors compared to paternal social supports, and (4) adolescents who never discussed personal matters with their fathers were more likely to engage in multiple sexual partnerships compared to the adolescents who did.

First of all, our finding of a statistically significant association between family meals and adolescent sexual behavior agrees with previous studies that have found consistent inverse relationships between frequent family meals and adolescent high-risk behaviors such as substance use, risky sexual behavior, antisocial behavior, binge eating/purging etcetera (Goldfarb et al. 2015; Levin, Kirby, and Currie 2012; Skeer and Ballard 2013). Family meals are, therefore, potentially important protective factors against risky sexual behavior since eating meals together are one of the most frequent joint family activities among most families (Garmienė, Žemaitienė, and Zaborskis 2006). Regular family meals may provide an opportunity for parents to reconnect with their children, spend time, exchange ideas and solve problems together. At the same time, family meals contribute to the strengthening of the traditions, values, and norms that tie families together while providing meaning and identity to the children's lives as they grow (Fulkerson et al. 2006). Parents also have the unique opportunity to observe, monitor and assess their

children's psychological state of mind, behaviors and emotional wellbeing during family meals and consequently share valuable information with them (Eisenberg et al. 2004). Moreover, time spent at family meals amounts to time spent away from negative peer influences while providing an opportunity for children to observe, appreciate, and model their parent's problem solving and social skills and interactions. Finally, frequent family meals provide consistency and stability in the lives of adolescents in this era of pervasive social media, television and smartphone apps, thereby enhancing their self-esteem and cognitive development (Fruh et al. 2011).

Second, our results reveal that provision of money and gifts by mothers could protect adolescents from unsafe sex. This finding aligns with the result from previous researchers who documented that adolescents that lack parental financial or emotional support are more likely to exchange sex for money (Kheswa 2017). Transactional sex promotes gender-based violence and exacerbates the gender power dynamics of relationships, making it even more difficult for girls to negotiate safe sex (Frost and Bingenheimer 2011). Also, transactional sexual practices tend to occur between adolescents and older partners with financial means (Frost and Bingenheimer 2011). Research shows that between 36% and 80% of sexually active adolescent girls in many parts of SSA reported receiving money or gifts in exchange for sex, and there are no significant differences by household economic status, orphan status, or level of schooling completed (Stoebenau et al. 2016). It has been postulated that adolescent girls could become somewhat financially independent of their male partners when their parents provide them with some material and financial support to meet their basic needs (Frost and Bingenheimer 2011). Such adolescents would be in better positions to negotiate safe sex and less likely to engage in sexual relationships based solely on monetary and material reasons.

Third, our analyses indicate that non-receipt of social supports from mothers has a statistically stronger association with the risk for dangerous sexual behaviors compared to non-receipt from fathers. Also, the impact of parental social support on sexual behavior does not differ according to the sex of the adolescent, a finding that does not align with our hypothesis of cross-gender effects. The former finding agrees with our hypothesis and reaffirms the results from previous studies which noted that mothers, compared to fathers, were more likely to have a more positive parent-child relationship and hence direct knowledge of adolescents' daily activities either through active supervision or voluntary disclosure by the adolescents (Crouter et al. 2005; Waizenhofer, Buchanan, and Jackson-Newsom 2004). A study on the impact of orphan status on adolescent sexual behaviors in Johannesburg, South Africa found more protective effects by surviving mothers compared to surviving fathers on adolescent risky sexual behavior (Mmari et al. 2016). According to our analyses, more young adults reported receipt of different types of social support from their mothers compared to their fathers. Also, in South Africa, cultural and historical issues such as the migrant labor systems and job insecurity have led to flexible living arrangements where most fathers are not co-resident with their children compared to the mothers (Madhavan, Townsend, and Garey 2008; Clark, Cotton, and Marteleto 2015). The physical and emotional closeness with mothers potentially enhances the bonding between the mothers and their children and consequently engenders trust, and reduces parent-child conflicts. Another study, however, found a different pattern of influence where paternal supervision was more protective of early sexual debut among male adolescents and maternal supervision was more protective of early sexual debut among female adolescents but not vice versa (Wilder and Watt 2002).

Finally, our analyses indicate that adolescents who never discussed personal matters with their fathers were more likely to have multiple sexual partners compared to adolescents who discussed personal matters with their fathers. This finding is in agreement with a recent review that found a consistent and significant association between father-adolescent communication and reduced risky sexual behavior by adolescents in the United States (Guilamo-Ramos et al. 2012). Although, little is known about how this process influences adolescent sexual behavior due to lack of research on the role of fathers in adolescent children's sexuality (Guilamo-Ramos et al. 2012), some researchers postulate that fathers seem to be more important than mothers in promoting differentiation, individuation, autonomy and sex roles behavior and attitudes of children (Kalina et al. 2013). We are, however, not able to tell if any of these reasons are related to our findings, and this calls for more research on the role of fathers in children's psychosocial development. Other researchers found that parent-child sexuality discussions, especially with mothers, is more protective from risky sexual behaviors among girls than boys (Widman et al. 2016). We did not find any statistically significant association between maternal-child communications and any sexual behaviors, or between paternal-child communications and the other sexual behaviors (early debut and unprotected sex). These results agree with the mixed findings from prior studies on the impact of parent-child communication on adolescent sexual behaviors (Langley 2016). Some of the reasons for our variable findings may be attributed to methodological and conceptual issues arising from the ways these questions were structured. The questions asked the young adults to indicate how frequently they have discussed personal matters with their parents without clarification on the content and quality of these conversations. It is well known that the content, style, and timing of conversations about sexual activity between parents and their children are as important as the frequency of the communication (Miller 2002).

A review of the literature from SSA, however, found inconclusive evidence to support the protective effect of parent-child communication on adolescent risky sexual behaviors (Bastien, Kajula, and Muhwezi 2011; Biddlecom, Awusabo-Asare, and Bankole 2009). Some of the reasons for this weak association include social and cultural inhibitions against discussions on sexuality or sexual activity with unmarried adolescents in SSA. Also, many parents in SSA lack knowledge on adolescent sexuality and also lack the skills on how to talk with adolescents on safe sexual behaviors. More often than not, parent-child communications about sexuality in Sub-Saharan Africa tend to be authoritarian, unidirectional, vague and indirect (Bastien, Kajula, and Muhwezi 2011; Biddlecom, Awusabo-Asare, and Bankole 2009; Kamangu, John, and Nyakoki 2017). These barriers to open and effective parent-child sexuality communication in SSA may also explain the mixed findings from our study.

2.5 Strengths and Weaknesses

One of the strengths of our study is that it explored the impact of parental social support at baseline (2002) on risky sexual behaviors at follow-up (2005) through longitudinal data, comparing the same young adults at two time periods. Since this panel data spanned three years where the exposures preceded the outcomes, our study is better suited to predict the longitudinal or causal associations between parental support and adolescent risky sexual behaviors compared to cross-sectional studies. To our knowledge, this is one of the very few research studies to examine the differential impact of the types of support, and sources of parental support on adolescent risky sexual behaviors in South Africa.

Some potential limitations should be considered when interpreting and weighing the results of our study. The data used for this analysis were collected in two waves with three years interval between the waves. Given that the relationship between parental social support and

sexual behaviors might be highly variable over time, this long interval between waves, and attrition of respondents between the waves may result in bias. Even though our study tried to establish a temporal association between parental social support and risky sexual behavior, only two waves of data were available for analysis. A dataset with longer follow-up period would have been better given that social support is a dynamic, interactive process. Since social support is conceptualized differently by different cultures (Chen et al. 2012; Kim, Sherman, and Taylor 2008; Mojaverian and Kim 2013; Sherman, Kim, and Taylor 2009), an instrument for measuring parental social support that is developed and validated in South Africa would have been more appropriate for this study given that most social support measuring instruments were adopted from a Western perspective. Finally, social desirability or recall bias may have affected the responses since all data were self-reported. Participants were, however, told that the information they provided was confidential to minimize these biases.

2.6 Conclusion

The analysis of the panel data of over 4,000 young adults aged 14-22 year suggests that there is a complex relationship between parental social support and adolescent sexual behaviors in South Africa. Overall, it appears that parental social supports are not very strong predictors of adolescent risky sexual behaviors in South Africa. We postulate, therefore, that there may be other important predictors outside of the family such as socio-cultural norms on gender equality and women's status in the society, poverty and low educational attainment, which are shaping the patterns of adolescent sexual behaviors in South Africa.

Despite the limitations, our research findings highlight the protective roles of eating family meals with mothers, providing material and financial support by mothers, and discussing personal matters with fathers, on adolescent risky sexual behavior. This study adds to the extant

body of evidence while filling in some knowledge gaps on this very significant association especially in SSA. The strength of the impact of frequent family meals not just on sexual behaviors but also on other youth risk behaviors (Eisenberg et al. 2004; Goldfarb et al. 2015; Levin, Kirby, and Currie 2012; Skeer and Ballard 2013) underscores the need for future research on the different mechanisms through which family meals influence adolescent behaviors using longitudinal studies. These understandings would assist in the design and implementation of creative, evidence-based, and family-centered interventions to counter peer influences and change adolescent health behaviors and outcomes. Our findings also indicate the need to create awareness on the benefits of family mealtime for health and social service providers for them to educate their clients and also the need for parents to avail themselves of the material and financial needs of their children.

Finally, more research is needed to develop a culturally appropriate sexuality education for parents/guardians and mentors in SSA that would enhance their ability to discuss sexual and reproductive health issues in an open, supportive, clear and bidirectional manner with their youth beyond expectations of abstinence (Sutton et al. 2014; Santa Maria et al. 2015; Gavin et al. 2015).

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Paper 3:

Maternal Breastfeeding Practices in North-Central Nigeria:

The Roles of Social Networks and Social Support

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3 Abstract

The global prevalence of early breastfeeding initiation, exclusive breastfeeding, and avoidance of pre-lacteal feeding has remained below the recommendations by the World Health Organization (WHO). Nigeria has the lowest rates of exclusive breastfeeding and highest rates of pre-lacteal feeding in Sub-Saharan Africa.

It has been shown that social support is positively associated with healthy breastfeeding practices, especially in developed nations. Few studies, however, have explored the relationships between formal or informal social support and breastfeeding practices in Sub-Saharan Africa in general and Nigeria in particular. There are still major knowledge gaps in the association between social support and breastfeeding practices especially in developing countries due to the mixed findings from the very few studies in this context. Also, very few studies have investigated the differential impact of the various sources, and types of social support on breastfeeding practices of women in developing countries.

This study investigated the cross-sectional association between social support and breastfeeding practices amongst women in north-central Nigeria. We found that support from mothers and fathers were associated with higher prevalence of early breastfeeding initiation and avoidance of pre-lacteal feeding respectively. On the other hand, support from neighbors and mothers-in-law were negatively associated with early breastfeeding initiation. Also, high levels of physical support were associated with higher likelihood of avoiding pre-lacteal feeding. In contrast, high levels of emotional support were associated with higher risk of pre-lacteal feeding. Our findings suggest that there are significant dual roles (positive/negative) of social support from older generations on breastfeeding, and physical support during the immediate postpartum periods may discourage pre-lacteal feeding amongst women in Nigeria.

3.1 Introduction

Breastfeeding (exclusive or partial) confers numerous short- and long-term physical and mental health benefits for infants and mothers, and economic benefits for society (Asiodu et al. 2017). A strong body of research demonstrates that breastfeeding is associated with lower risks of infant and child mortality due to infectious diseases, enhances infant's immune response to immunization against polio, tetanus, diphtheria, etcetera, and also reduced risks of breast and ovarian cancer for mothers (WHO. 2000; Balogun et al. 2016). Breastfeeding also promotes bonding between mother and child and enhances the infant's neurocognitive development (Lumbiganon et al. 2016). It may also lower the risk of postpartum depression (Leruth et al. 2017). Consequently, the World Health Organization (WHO) has the following recommendations regarding breastfeeding: (1) timely initiation of breastfeeding within one hour after delivery, (2) avoidance of feeding the newborn with any food or drink during the first few days of birth (i.e. pre-lacteal feeding), (3) exclusive breastfeeding (EBF) for all infants for the first six month of life, (4) after the first 6 months, infants should be given complementary foods with optimal continuation of breastfeeding for two or more years (Balogun et al. 2016; WHO 1995).

Despite the documented evidence of the health and emotional benefits of breastfeeding, early establishment and EBF remain low in most countries (McFadden et al. 2017). Globally, only 44% of newborns are put to the breast within the first hour after birth and 40% of children younger than six months are breastfed exclusively (UNICEF 2016). Nearly 50% of women in Sub-Saharan Africa (SSA) failed to establish breastfeeding within one hour after delivery, which may contribute to sub-optimal breastfeeding duration (Awi and Alikor 2006; Setegn, Gerbaba, and Belachew 2011; Kalisa et al. 2015; Tilahun et al. 2016). About 38% of women in Nigeria

initiate breastfeeding within 1 hour of birth (Berde and Yalcin 2016), 59% of them practice pre-lacteal feeding (Agho et al. 2016; Jimoh et al. 2017), and only 17% breastfeed exclusively for six months (Agunbiade and Ogunleye 2012; Okafor et al. 2018). In fact, Nigeria has the highest prevalence of pre-lacteal feeding and lowest rates of exclusive breastfeeding in Sub-Saharan Africa (Agho et al. 2016). It has been shown that pre-lacteal feeds interfere with early initiation of breastfeeding, disrupt exclusive breastfeeding and increase the risk of neonatal infection and mortality (Agho et al. 2016; Bililign et al. 2016; Jimoh et al. 2017; Khanal et al. 2016; Nguyen et al. 2013).

A review of the literature shows that some interventions to improve breastfeeding practices, such as prenatal breastfeeding education, counseling, and provision of social support, have been implemented in the past (Balogun et al. 2016; Feferbaum 2014; Haroon et al. 2013; Lumbiganon et al. 2016; Skouteris et al. 2014; Wood et al. 2016). Specifically, it has been shown that provisions of psychosocial support during the pregnancy periods (i.e., prenatal, intrapartum and post-partum periods) are potentially effective intervention strategies to improve breastfeeding outcomes (Brown, Raynor, and Lee 2011; Langer et al. 1998; Tylleskar et al. 2011).

The importance of the different types and sources of social support on breastfeeding behaviors varies according to the pregnancy periods when it is provided (Gjerdingen, Froberg, and Fontaine 1991). Each period is associated with peculiar barriers, and these multiple barriers interact across several levels of influence to hinder health breastfeeding practices. Social support interventions to promote breastfeeding practices should, therefore, reflect the socio-ecological perspectives of health behavior. The social-ecological models of health behavior postulate that multiple levels of contextual factors influence health behavior, at the same time these factors

interact with each other across levels (Bronfenbrenner 1986; Glanz et al. 2008). This is important because the mother-child dyad, which is nested within the family, is influenced in a complex manner by attitudes and decision-making of multiple household actors and the sociocultural systems of the community, at the same time these factors interact with each other across levels.

There is a wealth of literature on studies that have evaluated the impact of social support from both formal/professional social networks (healthcare workers, doulas, breastfeeding consultants) and informal social networks (family, friends and peers) on breastfeeding practices. Some systematic reviews and one intervention study note positive associations between social support and healthy breastfeeding practices (McFadden et al. 2017; Renfrew et al. 2012; Langer et al. 1998), but other reviews note mixed results (Jolly et al. 2012; Sikorski et al. 2003; Sipsma, Jones, and Cole-Lewis 2015). Few studies, however, have explored the relationships between formal or informal social support and breastfeeding practices in SSA in general and Nigeria in particular (Olayemi et al. 2007; Sudfeld, Fawzi, and Lahariya 2012; Tylleskar et al. 2011; Mangasaryan et al. 2012). There are still major knowledge gaps in the association between social support and breastfeeding practices, especially in developing countries. These gaps are due to the overall mixed findings from the limited previous studies. Also, most of these studies in developing countries investigated only support from husbands, older female relatives or peers on exclusive breastfeeding or breastfeeding duration (Mangasaryan et al. 2012; Olayemi et al. 2007; Sudfeld, Fawzi, and Lahariya 2012; Tylleskar et al. 2011). No studies, to our knowledge, have explored the differential effect of all the possible different sources (i.e. spouse, mothers, fathers, siblings, friends, neighbors, mothers-in-law, co-wives) or different types (i.e. emotional e.g. love, informational e.g. advice, physical e.g. household chores, and financial e.g. monetary gifts or loans) of social support (House 1981) on breastfeeding initiation and pre-lacteal feeding.

To address some of these gaps, we conducted a cross-sectional study of over 400 women attending prenatal clinic in Keffi, north-central Nigeria to investigate: 1) whether the different sources of social support have differential impact on women's breastfeeding practices (i.e. breastfeeding initiation and pre-lacteal feeding), and 2) If specific types of social support are associated with early initiation of breastfeeding and avoidance of pre-lacteal feeding.

The aim of this study was to investigate the cross-sectional association between social support and breastfeeding practices amongst women in north-central Nigeria. We hypothesized that there would be a higher prevalence of healthy breastfeeding practices (early initiation and avoidance of pre-lacteal feeding) among women who received social support from their family members (e.g., spouses, parents, or siblings) compared to those that received support from non-family members (e.g., friends or neighbors). Different people have different preferences for the various types of social support, and from whom they seek support. Previous studies show that kin and non-kin social support are associated with different and distinctive outcomes in the perceptions and reliability of support, and in psychosocial wellbeing (Seeman and Berkman 1988; Potts 1997; Dean, Kolody, and Wood 1990). Some researchers found that kin support may have stronger associations with psychological health outcomes compared to non-kin support (Almeida et al. 2011; Bassuk et al. 2002; DuPertuis, Aldwin, and Bossé 2001).

We also hypothesize that non-tangible support (e.g., emotional and informational supports) would be more predictive of early initiation of breastfeeding and avoidance of pre-lacteal feeding compared to tangible support (e.g., financial and physical supports). Research shows that non-tangible support and tangible support influence breastfeeding behavior through different pathways. While non-tangible support is mainly concerned with the maintenance and transfer of healthy breastfeeding attitudes, tangible support target the costs and benefits

surrounding breastfeeding (Emmott and Mace 2015). It has also been shown that women are more likely to seek emotional social support from their significant others compared to men (Day and Livingstone 2003; Thoits 1995).

Overall, findings from previous studies from developing countries align with all the above hypotheses (Giugliani et al. 1994; Gjerdingen, Froberg, and Fontaine 1991; Hall Moran et al. 2007; Matich and Sims 1992; Morhason-Bello et al. 2008).

3.2 Methods

3.2.1 Data Collection

This study uses data from the household interviews of the *Pilot Study on the Quality of Care in Antenatal Care and Patterns of Maternal Health Behavior in North-Central Nigeria*. The study conducted cross-sectional surveys of approximately 1,500 adult men and women living in Nassarawa State, north-central Nigeria between October 2013 and July 2014. About 40 communities were randomly selected out the 72 communities in Keffi Local Government Area of Nassarawa State for the household interviews. Thirteen households were then randomly selected from each community ($40 \times 13 = 520$ households). The selection of the households was done by starting with a random draw number from a list of numbers with starting point one and endpoint the total count of the households in each community and then selecting each n^{th} household (where $n = \text{total number of households} / 13$). Three adults (both men and women) were selected randomly within each household to yield a target sample size of about 1500 for the household interview ($520 \times 3 = 1560$). All the 647 (43%) male respondents that completed the survey were dropped from out analytic sample. About 853 (57%) women completed the survey, but about 380 of them have never breastfed a child and hence were not included in our analytic sample. Also, 18 women who were aged more than 60 years were dropped from our sample to

minimize recall bias. It is shown that in populations with where breastfeeding is common; breastfeeding practices were recalled accurately 15-20 years after giving birth (Natland et al. 2012; Tienboon, Rutishauser, and Wahlqvist 1994; Promislow, Gladen, and Sandler 2005).

The eligible analytic sample for the current analysis included 455 (30%) women who had breastfed at least one child and were 60 years old or less at the time of the interview. The study questionnaire assessed general perceptions of the quality of antenatal care, as well as beliefs about antenatal care effectiveness and usefulness, and respondents' social networks and social support, and on pregnancy-related experiences including breastfeeding practices. Data for this study was collected through structured face-to-face interviews of eligible respondents. The interviews were conducted by bilingual (English and Hausa) research assistants had been previously trained in a structured interviewing technique using our household survey questionnaire. The research assistants filled out the questionnaire with answers from the respondents during the interview process.

3.2.2 Dependent variables

The outcome variables of interest are mothers' self-reported breastfeeding practices during the first three days following their last delivery. The respondents were asked if they breastfed their last child. Those who responded "yes" to this question were asked follow-up questions including: (1.) "How long after birth did you first put the newborn to the breast?" We dichotomized their answers into "early breastfeeding initiation" if the newborn was put to the breast within an hour after birth and "late breastfeeding initiation" if the newborn was put to the breast more than an hour after birth. (2.) "In the first three days after delivery, was the newborn given anything to drink or eat other than breast milk?" Each respondent's answer to this question

on pre-lacteal feeding was coded as "1" if he/she answered "no" and "0" if he/she answered "yes."

3.2.3 Independent variables

Instrument: Social networks and social support were measured using the Close Persons Questionnaire (CPQ), which measures multiple dimensions of social support (Stansfeld and Marmot 1992). The CPQ assesses both the structural and functional aspects of social support by including questions on both social networks (sources of social support) to represent the structural aspects of social support, and quality of social support (different types of social support) to represent the functional aspects of social support (Stansfeld and Marmot 1992). Questions from Berkman and Syme (Berkman and Syme 1979) assessed sources of support, including frequency of contact with relatives, friends, neighbors, etc. Questions on the different types of social support explored four different functional aspects of social support: emotional (e.g. empathy, love, trust, caring), instrumental (e.g. tangible aid, money, gifts, and services), informational (e.g. advice, suggestions, health information), and appraisal support (e.g. constructive feedback and affirmation). The format of the questions was derived from Schaefer et al. (Schaefer, Coyne, and Lazarus 1981) and Power et al. (Power, Champion, and Aris 1988).

3.2.3.1 Sources of Social Support

To delineate egocentric social networks (sources of social support), the respondents (egos) were invited to generate names of up to six close adults (alters) whom they were in communication with and who provided any form of support to them in the past six months. Follow up questions asked each respondent to identify their relationships to each of the six adults named earlier (e.g., spouse, mother, father, siblings, co-wife, friend, neighbor, or mother-in-law) as well as their frequency of contact/interaction (Althoff et al. 2017; Liu 2017; Baranowski et al.

1983). Further details on the sex, age and educational attainment of each of the members of their social networks were collected from the respondent. We generated new variables named "spouse", "mother", "father", "sibling", "co-wife", "friend", "neighbor" and "mother-in-law" across all the named alters to represent the sources of social support. Each of the sources of social support (e.g., spouse) was treated as a binary variable and coded as "1" for respondents that got support from their spouses (yes) and "0" for respondents that did not get support from their spouses (no),

3.2.3.2 Types of Social Support

Each respondent was asked how frequently they received each type of social support (emotional, informational, physical and financial support) from the six alters they had identified earlier using a grid method. The aim was to assess the level of functional social support from these six sources of support. Descriptions of each type of social support, adopted from Wills and Shinar's definitions, were provided and explained to the respondents (Hall 2010). The frequency of receipt of each of the types of support was measured on a 7 point scale: "1" if they received support every day, "2" if they received support a few times per week, "3" if they received support once per week, "4" if they received support a few times per month, "5" if they received support once per month, "6" if they received support a few times per year and "7" if they received support once per year or less (Hall 2010; Liu 2017). We calculated the total score of each respondent's frequency of receipt of each type of support across all the named alters (i.e., a minimum of 6 and a maximum of 42) (Harling et al. 2017). Since the total scores of the different types of support were fairly normally distributed among our study participants, we adopted the 50th percentile (median) of each type of support as the cut-off between high and low frequency of support. Also, we adopted the concept of high and low levels of social support to align with

similar strategies adopted by previous researchers in the field (Liu 2017; Henly, Danziger, and Offer 2003). The frequency of receipt of each type of support was treated as a binary variable (high vs. low).

3.2.4 Confounders

The sociodemographic variables included in our analyses are: Age (Continuous), Number of Life Births (Continuous), Education (High School or more/Less than high school), and Employment (Employed/Unemployed), Marital Status (Married/Unmarried), and Ever Lost a Child (Yes/No). Age and number of live births were stratified into three categories each (18-30 years, 31-40 years, and More than 40 years) and (1-2 live births, 3-4 live births, and more than 4 live births) respectively for descriptive purposes (see table 1) and employed as continuous variables in all analyses.

3.2.5 Statistical analysis

All analyses were conducted using STATA version 12 SE (StataCorp 2011). Descriptive statistics were used to examine the characteristics of the study sample. We, then, estimated the bivariate relationship between the sociodemographic variables and breastfeeding practices using chi-square test (Table 3.1). The distributions of the different sources and types of social support were shown in Table 3.2.

Finally, multivariable logistic regression analyses were conducted to examine the association between each of the different sources and types of social supports, and each of the breastfeeding practice (breastfeeding initiation and pre-lacteal feeding) using the logit link function in STATA (Tables 3.3 and 3.4). Each of the sources (e.g., spouse) and types (e.g., emotional) of social support was treated as a binary variable and modeled as an independent

variable in the multivariable logistic regression models. The odds ratio (OR) and the 95% confidence intervals (CI) were derived in each case.

We conducted four multivariable regression models to estimate the unadjusted, partially adjusted and fully adjusted associations of each source and type of social supports and breastfeeding initiation (Table 3.3). In model 1, we estimated the crude associations of sources of social support and breastfeeding initiation. In model 2, we estimated the crude associations of types of social support and breastfeeding initiation. In model 3, we partially adjusted for both the sources and types of social support. In model 4, we fully adjusted for both sources and types of social support, and sociodemographic variables (Table 3.3). We also conducted four multivariable regression models to estimate the unadjusted, partially adjusted and fully adjusted associations of each source and type of social supports and pre-lacteal feeding (Table 3.4).

3.3 Results

3.3.1 Socio-demographic characteristics according to breastfeeding practices

Table 3.1 presents the sociodemographic characteristics of the women stratified according to breastfeeding initiation and pre-lacteal feeding. The mean age of the participants was 31.6 (SD 8.6). The average number of live births by the women was 4.3 (SD 2.7). More than half of the women (53%) had attained elementary educational level or less. About 75% of the women were unemployed, over 94% was married, and only 28% had ever lost a child.

Table 3.1 also shows that about 68% of women initiated breastfeeding with 1 hour of delivery, while about 65% avoided pre-lacteal feeding of their newborn during their last childbirth. In general, there are no statistically significant differences in the proportions of participants that reported early initiation or avoidance of pre-lacteal feeding according to the

different categories of socio-demographic characteristics. However, more educated women were more likely to avoid pre-lacteal feeding compared to the less educated ones (73% v. 59%, $p=0.002$). Also, participants that had ever lost a child were more likely to initiate breastfeeding early compared to those that had never lost a child (75% vs. 65%, $p=0.035$). Overall, about 45% of the women initiated breastfeeding early and avoided pre-lacteal feeding, 22% initiated early but practiced pre-lacteal feeding, 20% initiated late but avoided pre-lacteal feeding, and only 12% initiated late and practiced pre-lacteal feeding (data not shown).

Table 3.1: Socio-demographic Characteristics of the Women Stratified according to Breastfeeding Practices
N=455

Socio-demographic Characteristics			Breastfeeding Practices					
			Breastfeeding Initiation			Prelacteal Feeding		
			Within One Hour Post-partum	Total	p-value	No	Total	p-value
	n (%)	Mean (SD)	n (%)	n		n (%)	n	
Age- years (continuous)		31.6 (8.6)						
Age (categorical)								
18-30 years	269 (59.1)		181 (72.1)	251		168 (65.6)	256	
31-40 years	127 (27.9)		78 (62.4)	125		84 (67.2)	125	
>40 years	59 (13.0)		33 (58.9)	56		34 (59.7)	57	
Total	455		292 (67.6)	432	0.055	286 (65.3)	438	0.602
Number of Livebirths (continuous)		4.3 (2.7)						
Number of Livebirths (categorical)								
1-2 Livebirths	131 (29.1)		79 (68.1)	116		72 (60.5)	119	
3-4 Livebirths	121 (26.8)		79 (65.3)	121		85 (70.3)	121	
>4 Livebirths	199 (44.1)		133 (68.6)	194		129 (65.5)	197	
Total	451		291 (67.5)	431	0.824	286 (65.4)	437	0.284
Education								
Primary or Less	232 (52.8)		148 (65.8)	225		134 (58.8)	223	
Secondary or More	207 (47.2)		134 (69.1)	194		143 (73.0)	196	
Total	439		282 (67.3)	419	0.474	277 (65.3)	424	0.002
Employment								
Unemployed	338 (74.6)		213 (66.6)	320		204 (62.8)	325	
Employed	115 (25.4)		77 (70.0)	110		80 (72.1)	111	
Total	453		290 (67.4)	430	0.507	284 (65.1)	436	0.076
Marital Status								
Unmarried	26 (5.7)		14 (66.7)	21		12 (52.2)	23	
Married	427 (94.3)		277 (67.7)	409		273 (66.1)	413	
Total	453		291 (67.7)	430	0.919	285 (65.4)	436	0.172
Ever Lost a Child								
No	324 (71.8)		198 (64.5)	307		207 (66.6)	311	
Yes	127 (28.2)		93 (75.0)	124		78 (61.9)	126	
Total	451		291 (67.5)	431	0.035	285 (65.2)	437	0.355

Notes: 4 cases (0.88%) missing Number of Livebirths, 16 (3.5%) cases missing Education, 2 (0.44%) cases missing Employment, 2 cases (0.44%) missing Marital Status, 4 cases (0.88%) missing Ever lost a Child.

3.3.2 Distribution of Sources, Types/Frequency of Social Support among the Women

Table 3.2 presents the distributions of the different sources and types/frequencies of social support reported by the women. About 48% of the women reported receiving social support from their spouses. Over 23% received support from their mothers, while only 15% received support from their fathers. Over 67% of them reported receiving support from their siblings, about 72% of them received support from their friends, and 54% received from their neighbors while only 18% and 11% of them received support from their co-wives and mothers-in-law respectively. The distributions of the frequencies of receipt of the different types of social support indicate that high levels of emotional and financial support were relatively common (57% and 52% respectively) among our study participants compared to low levels of emotional and financial support (43% and 48% respectively). On the other hand, high levels of physical and informational support (49% and 48% respectively) were less prevalent than low levels of physical and informational support (51% and 52% respectively).

**Table 3.2: Distribution of Sources, Types/Frequency of Social Support reported by the Women
N=455**

Sources of Social Support					Types and Frequency of Social Support			
		n	Percent				n	Percent
Spousal Support	Yes	220	48.4		Emotional	High	255	57.4
	No	235	51.7			Low	189	42.6
Maternal Support	Yes	107	23.5		Physical	High	219	49.3
	No	348	76.5			Low	225	50.7
Paternal Support	Yes	70	15.4		Informational	High	215	48.4
	No	385	84.6			Low	229	51.6
Sibling's Support	Yes	307	67.5		Financial	High	232	52.3
	No	148	32.5			Low	212	47.8
Friend's Support	Yes	331	72.7					
	No	124	27.3					
Co-wife's Support	Yes	81	17.8					
	No	374	82.2					
Neighbor's Support	Yes	246	54.1					
	No	209	45.9					
Mother-in-law's Support	Yes	50	11					
	No	405	89					

Notes: 11 cases (2.4%) missing each emotional, physical, informational and financial supports

3.3.3 Multivariable logistic regression of the association between the sources and types of social support, and breastfeeding initiation

Table 3.3 displays the results of multivariable models estimating associations between the sources and types of social support and breastfeeding initiation adjusted for sociodemographic variables. Women who received social support from their mothers have statistically significant higher odds of initiation breastfeeding early compared to women who did not receive any support from their mothers (OR=1.91, 95%CI: 1.03-3.53). On the other hand, women who received support from their neighbors and their mothers-in-law were less likely to initiate breastfeeding early compared to those that did not receive support from their neighbors and their mothers-in-law (OR=0.40, 95% CI: 0.24-0.64) and (OR=0.46, 95% CI: 0.22-0.96) respectively. There are no statistically significant relationships between the other sources of social support and breastfeeding initiation. Also, there are no significant associations between any particular types of social support and breastfeeding initiation.

Table 3.3: Multivariable Logistic Regression of the Association between the Sources and Types of Social Support, and Breastfeeding Initiation

		Breastfeeding Initiation							
		<i>Crude Estimates For Sources of Support</i>		<i>Crude Estimates For Types of Support</i>		<i>Partially Adjusted for Sources and Types of Support</i>		<i>Fully-Adjusted</i>	
Independent Variables		<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
Spousal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.15	(0.75-1.76)			1.05	(0.67-1.64)	0.89	(0.55-1.44)
Maternal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.66	(0.95-2.91)			1.71	(0.96-3.05)	1.91	(1.03-3.53)*
Paternal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.17	(0.63-2.17)			1.16	(0.62-2.18)	1.22	(0.63-2.36)
Sibling's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.38	(0.88-2.15)			1.47	(0.94-2.31)	1.40	(0.87-2.24)
Friend's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.94	(0.56-1.55)			0.87	(0.52-1.48)	0.69	(0.39-1.23)
Co-Wife's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.95	(0.55-1.63)			0.99	(0.57-1.73)	0.92	(0.51-1.65)
Neighbor's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.42	(0.27-0.66)***			0.40	(0.26-0.64)***	0.40	(0.24-0.64)***
Mother-in-law's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.66	(0.34-1.28)			0.57	(0.29-1.14)	0.46	(0.22-0.96)*
Emotional Support	<i>Low</i>			1		1		1	
	<i>High</i>			1.28	(0.82-2.00)	1.28	(0.81-2.02)	1.30	(0.81-2.10)
Physical Support	<i>Low</i>			1		1		1	
	<i>High</i>			1.23	(0.73-2.10)	1.26	(0.74-2.20)	1.18	(0.67-2.07)
Informational Support	<i>Low</i>			1		1		1	
	<i>High</i>			0.64	(0.36-1.13)	0.66	(0.37-1.19)	0.60	(0.32-1.11)
Financial Support	<i>Low</i>			1		1		1	
	<i>High</i>			1.18	(0.74-1.89)	1.09	(0.67-1.76)	1.13	(0.68-1.86)
Age								0.97	(0.94-0.99)*
Number of Life Births								0.99	(0.91-1.10)
Education	<i>Primary or Less</i>							1	
	<i>Secondary or More</i>							1.17	(0.72-1.89)
Employment	<i>Un-employed</i>							1	
	<i>Employed</i>							1.25	(0.72-2.16)
Marital Status	<i>Unmarried</i>							1	
	<i>Married</i>							1.07	(0.39-2.93)
Ever Lost a Child	<i>No</i>							1	
	<i>Yes</i>							1.85	(1.07-3.20)*

Notes: * $p < 0.05$, ** $P < 0.01$, *** $p < 0.001$.

3.3.4 Multivariable logistic regression of the association between sources and types of social support and pre-lacteal feeding

Table 3.4, shows the results of multivariable models estimating associations between sources and types of social support and pre-lacteal feeding adjusted for sociodemographic variables. Women who received high levels of physical social support from their network members have statistically significant higher odds of avoidance of pre-lacteal feeding of their newborns compared to women who received low levels of physical social support (OR=2.94, 95%CI:1.65-5.22). On the other hand, women who received high levels of emotional social support have a statistically significant higher risk of pre-lacteal feeding compared to women who received low levels of emotional social support (OR=0.61, 95%CI:0.37-0.98). Finally, women that received social support from their fathers have statistically significant higher likelihood of avoidance of pre-lacteal feeding compared to those that did not receive any support from their fathers (OR=2.20, 95%CI: 1.08-4.49). The other sources and types of social support did not have any significant statistical associations with pre-lacteal feeding.

Also, multivariable logistic regression of the association between sources and types of social support, and a combined outcome of both breastfeeding initiation and pre-lacteal feeding showed non-significant associations with any of the predictor variables (data not shown).

Table 3.4: Multivariable Logistic Regression of the Association between the Sources and Types of Social Support, and Pre-lacteal Feeding

		Pre-lacteal Feeding							
		<i>Crude Estimates For Sources of Support</i>		<i>Crude Estimates For Types of Support</i>		<i>Partially Adjusted for Sources and Types of Support</i>		<i>Fully-Adjusted</i>	
Independent Variables		<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
Spousal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.87	(0.58-1.31)			0.97	(0.63-1.49)	0.93	(0.58-1.50)
Maternal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.23	(0.74-2.05)			1.18	(0.70-2.00)	1.23	(0.71-2.14)
Paternal Support	<i>No</i>	1				1		1	
	<i>Yes</i>	2.36	(1.22-4.55)*			2.32	(1.18-4.55)*	2.20	(1.08-4.49)*
Sibling's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.31	(0.85-2.03)			1.46	(0.93-2.29)	1.38	(0.86-2.22)
Friend's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	1.04	(0.65-1.68)			1.02	(0.63-1.67)	1.01	(0.60-1.70)
Co-Wife's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.89	(0.53-1.50)			0.85	(0.50-1.45)	0.83	(0.47-1.46)
Neighbor's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.85	(0.56-1.29)			0.87	(0.56-1.34)	0.86	(0.54-1.36)
Mother-in-law's Support	<i>No</i>	1				1		1	
	<i>Yes</i>	0.96	(0.50-1.85)			1.09	(0.55-2.16)	1.27	(0.61-2.61)
Emotional Support	<i>Low</i>			1		1		1	
	<i>High</i>			0.57	(0.36-0.90)*	0.58	(0.36-0.92)*	0.61	(0.37-0.98)*
Physical Support	<i>Low</i>			1		1		1	
	<i>High</i>			2.84	(1.67-4.81)***	2.78	(1.62-4.78)***	2.94	(1.65-5.22)***
Informational Support	<i>Low</i>			1		1		1	
	<i>High</i>			0.73	(0.41-1.28)	0.74	(0.41-1.33)	0.68	(0.36-1.27)
Financial Support	<i>Low</i>			1		1		1	
	<i>High</i>			1.39	(0.87-2.23)	1.37	(0.84-2.22)	1.38	(0.84-2.29)
Age								0.99	(0.96-1.01)
Number of Life Births								1.08	(0.98-1.19)
Education	<i>Primary or Less</i>							1	
	<i>Secondary or More</i>							1.70	(1.05-2.74)*
Employment	<i>Un-employed</i>							1	
	<i>Employed</i>							1.50	(0.87-2.61)
Marital Status	<i>Unmarried</i>							1	
	<i>Married</i>							2.40	(0.95-6.12)
Ever Lost a Child	<i>No</i>							1	
	<i>Yes</i>							0.79	(0.47-1.33)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.4 Discussion

We investigated the cross-sectional association between different sources and types of social support and breastfeeding practices (breastfeeding initiation and pre-lacteal feeding) among women in north-central Nigeria. This study revealed four salient findings: (1) Women who received support from their mothers were more likely to initiate breastfeeding early compared to women who did not receive maternal support. Also women who received support from their fathers were more likely to avoid pre-lacteal feeding compared to those who did not receive paternal support. (2) Receipt of social support from neighbors and mothers-in-law were negatively associated with early breastfeeding initiation. (3) Women who received high frequency of physical social support from their network members were more likely to avoid pre-lacteal feeding of their newborn compared to women who received low levels of physical support. Finally, (4) receipt of high levels of emotional social support compared to low levels of emotional support is associated with higher risk of pre-lacteal feeding among our study participants.

Our findings of a positive association between parental support and healthy breastfeeding practices are consistent with results from other studies, which conclude that older generations (especially grandmothers) exert a significant positive impact on breastfeeding practices, especially when these older female generations have favorable attitudes to breastfeeding (Agunbiade and Ogunleye 2012; Negin et al. 2016). Studies have shown that in Nigeria, as well as other developing countries, the older generation especially the infant's grandmothers (i.e. mother's mother), mothers-in-law (i.e. father's mother), and other older relatives play very significant roles as caregivers on issues regarding reproductive and child health, and child-rearing in the family (Agunbiade and Ogunleye 2012; Negin et al. 2016). Decisions on various

aspects of pregnancy, childbirth and breastfeeding practices are influenced by the older generation either directly or indirectly. Given these culturally prescribed roles and values, cultural expectations and limited parental knowledge on, and attitudes to breastfeeding are, therefore, important determinants of breastfeeding practices by Nigerian women. Therefore, parents with a positive disposition to exclusive and early breastfeeding initiation are more likely to support and encourage their daughters or daughters-in-law to initiate breastfeeding early, avoid pre-lacteal feeding and breastfeed exclusively (Karmacharya et al. 2017). Supportive resources and guidance provided by parents during the immediate postpartum period could work to mitigate psychosocial and physical stressors associated with childbirth.

The current study also reveals that social support from mothers-in-law (i.e., paternal grandmother) have statistically significant negative associations with early breastfeeding initiation. Some previous studies found that grandmothers may have a positive impact on breastfeeding (Agunbiade and Ogunleye 2012; Negin et al. 2016), while others found a negative influence on breastfeeding by grandmothers (Grassley and Eschiti 2008; Uchendu, Ikefuna, and Emodi 2009). These studies, however, did not distinguish between maternal and paternal grandmothers (i.e., mothers-in-law) as our study did. Also, the present study investigated the separate impacts of types of social networks members on breastfeeding. One previous study found inter-ethnic differences in infant feeding advice and assistance from network members among Cuban, Puerto Rican and Anglo families in Florida. Maternal grandmothers are the key decision makers on infant feeding matters among Cuban and Puerto Rican respondents, but they have relatively little influence on Anglo families' infant feeding patterns (Bryant 1982). Among the three ethnic groups, paternal grandmothers have a relatively minimal impact on their daughters-in-law's decisions on infant feeding (Bryant 1982). Our results agree with findings by

other researchers which note that support from mothers-in-law (paternal grandmothers) may exert little positive or even negative influence on pro-breastfeeding behaviors of daughters-in-law (Susin, Giugliani, and Kummer 2005; Bryant 1982). The opinion, advice or outright opposition from mothers-in-law may reflect cultural beliefs and attitudes that encourage pre-lacteal feeding but discourage early initiation and exclusivity of breastfeeding.

Few studies have explored the influence of neighbors on breastfeeding practices. Some researchers note that interactions with neighbors may discourage women from breastfeeding (Usman et al. 2015; Bryant 1982) and these findings align with our data. Neighbors and friends are major sources of information about lactation difficulties and breastfeeding problems, e.g., sucrose supplementation during breastfeeding to prevent infant colic (Bryant 1982). More often than not, the advice and recommendations from neighbors and friends are not based on sound medical expertise and hence more likely to be unreliable or incorrect, and may lead to unhealthy breastfeeding practices.

Literature suggests that the process of breastfeeding is a part of the wider context of the cultural practices, and social norms existing in each society. Hence, the relative magnitude and direction of the impact on breastfeeding practices by the different source of social support may vary in different populations and cultures (Daglas and Antoniou 2012; Giugliani et al. 1994). For instance, a study in the United States (U.S.) found that most important source of social support for initiating breastfeeding was a close friend for African-Americans, mother's mother (i.e., maternal grandmother) for Mexican-Americans and male partner for Anglo-Americans (Baranowski et al. 1983). Also, other studies found that the opinion and support of male partners was the most important determinant of breastfeeding behaviors among women in the U.S. and Australia respectively (Giugliani et al. 1994; Kervin, Kemp, and Pulver 2010). Our study,

however, found that support from spouses and friends did not have a statistically significant association with breastfeeding initiation.

On the other hand, our analyses show that there are no statistically significant associations between the different types of social support and breastfeeding initiation. These observations neither align with our hypothesis, nor with findings from previous studies which concluded that there were positive associations between the different types of social support and breastfeeding behaviors (Kervin, Kemp, and Pulver 2010; Langer et al. 1998; Hall Moran et al. 2007; Matich and Sims 1992). One reason that could explain these null associations may be related to methodological issues. The respondents were asked about how frequently they received each type of social support from their social networks. However, literature shows that, in general, perceived social support (i.e., perceptions concerning the general availability of support and/or global satisfaction with support provided) is a stronger and more consistent predictor of health outcomes than received social support (i.e., the specific supportive behaviors that are provided to recipients by their networks members) (Haber et al. 2007; Wethington and Kessler 1986). More research is therefore needed to investigate this relationship further with more appropriate social support instrument.

Our findings also indicate that women who received high levels of physical social support from their network members were more likely to avoid pre-lacteal feeding of their newborns compared to those who received low levels of physical support. Some of the predictors of pre-lacteal feeding include young age, low SES, home delivery, cultural belief systems, and postpartum stressors (e.g., cesarean sections, episiotomies, instrumental deliveries, and breastfeeding difficulties) (Agho et al. 2016; Khanal et al. 2016; Nguyen et al. 2013; Tariku et al. 2016). Most importantly, previous research notes that high rates of operative and instrumental

deliveries in developing countries contribute to high rates of pre-lacteal feeding because the pain and discomfort associated with these procedures interfere with prompt and proper breastfeeding (Nguyen et al. 2013). Evidence from Nigeria shows a very high prevalence of episiotomy that ranges from 34.4% to 65.6% compared to the 10% recommended by the WHO (Alayande, Amole, and Akin 2012; Garba et al. 2016; Izuka et al. 2014; Otoide, Ogbonmwan, and Okonofua 2000). So, assisting the Nigerian parturient with physical support such as provisions of food or food preparations, childcare, purchasing hospital consumables, paying bills and other domestic errands/housework would free up enough time for her to rest and recover from the discomfort and pain associated with the childbirth. This high level of physical support could translate into more time spent on feeding the newborn with human breastmilk instead of breastmilk substitutes. Moreover, experienced network members could serve as informal lactation consultants and counselors through guidance and demonstrations on proper breastfeeding techniques (e.g., positioning and latching the newborn at the breast), and procedures for breastmilk extraction. This type of physical support has also been shown to be highly effective in overcoming pain and difficulties associated with breastfeeding due to blockage and cracked nipples, especially in areas where professional support is not widely available such as Nigeria (Patel and Patel 2016; CDC 2015).

Finally, our analysis shows that women who reported receipt of high levels of emotional support from their network members were more likely to practice pre-lacteal feeding compared to those who received low levels of emotional support. Breastfeeding is associated with a complex array of positive and negative psychosocial and emotional experiences that may be somewhat contradictory (Diaz Meneses 2013). More often than not, the mainstream cultural and biomedical narratives expect new mothers to present an easy and positive attitude and

relationship with breastfeeding, but this may not always reflect the true situation of some mothers. Apart from the positive experiences such as joy for a successful childbirth, and the intimate and harmonious relationship with the newborn; some women may also experience some negative emotions such as shame and social embarrassment of breastfeeding in front of family or public, stigmatization for their breastfeeding choices or style, feeling of guilt and inadequacy, and loss of autonomy and control over their bodies/selves (Kominou et al. 2017). Also, some women might experience mental/psychological health problems such as postpartum depression, anxiety or stress. The association between high levels of emotional support and high risk of pre-lacteal feeding observed in our study could be due to confounding by the psychological and mental health state of our participants. We could not control for this variable in our analyses because we did not collect the data. It has been shown that women who experience emotional distress, postpartum anxiety or depression in the immediate postpartum periods are less likely to initiate breastfeeding early, more likely to practice pre-lacteal feeding or formula supplementation, and also at increased risk of reduced breastfeeding duration (Dennis and McQueen 2009; Fallon et al. 2016). Also, because of their negative emotional and psychosocial symptomatology, these women are also more likely to attract high levels of emotional/affective support such as empathy, encouragement and caring from their network members. Another possible explanation for this paradoxical association between emotional support and pre-lacteal feeding could be reverse causation. Research has shown that women who practice pre-lacteal feeding or formula supplementation are more likely to report subjective experiences of guilt, inadequacy, and isolation (Williams, Donaghue, and Kurz 2013). Behavioral manifestations of these feelings by these women could attract high emotional support from their network members. It is, therefore, difficult to explain the nature or direction of the association between emotional

support and pre-lacteal feeding from our data. Longitudinal or randomized controlled studies that would collect data on the psychosocial/mental health status among other covariates are, therefore, needed to tease out this paradoxical relationship.

To our knowledge, this is the first study that has investigated, specifically, the association between social support and pre-lacteal feeding. Even though the associations between social support and EBF have been extensively studied with mixed results (Haroon et al. 2013; McFadden et al. 2017; Renfrew et al. 2012; Sikorski et al. 2003; Skouteris et al. 2014; Sudfeld, Fawzi, and Lahariya 2012), still it is not known if social support would impact pre-lacteal feeding in a similar manner as it does EBF. It is, however, known that women who practice pre-lacteal feeding are less likely to practice EBF and more likely to discontinue breastfeeding prematurely (Agho et al. 2016; Bililign et al. 2016; Jimoh et al. 2017; Khanal et al. 2016; Nguyen et al. 2013). It is, therefore, imperative that we explore and develop different ways to discourage pre-lacteal feeding using social support interventions as these might also have a positive impact on EBF and breastfeeding durations.

3.5 Strengths and Weaknesses

The current study's exploration of the differential impact of the different sources (e.g., spouses, mothers, fathers, siblings, mothers-in-law, etc.) and type of social support (emotional, financial, etc.) on breastfeeding practices adds to the extant body of knowledge in this field. Its ability to disentangle, specifically, the separate and distinctive influences of maternal vs. paternal grandmothers among our study population is an interesting finding which fills a major knowledge gap. The use of the Close Persons Questionnaire (CPQ), a validated instrument that measures multiple dimensions of social support, and the sampling design that ensured that our study sample is representative of the population add to the strength of the study.

Some of the potential limitations of this study also deserve consideration. Conclusions about causality cannot be drawn from this study given its cross-sectional design. Also, social desirability or recall bias is potentially a problem since mother self-reported their breastfeeding practices during the first three days following their last delivery. To minimize bias, participants were informed that the information they provided was confidential. We believe that the impact of these biases on our results would be insignificant given that there is little or no reason to believe that our study participants differentially recalled information based on their exposure and outcome status. It is also known that women can recall accurately their breastfeeding practices after 15-20 years postpartum (Natland et al. 2012; Tienboon, Rutishauser, and Wahlqvist 1994; Promislow, Gladen, and Sandler 2005). The study was conducted in north-central Nigeria. A multi-site study that includes different locations in Nigeria would have produced more generalizable data given that Nigeria is a multicultural and multiethnic country since it is known that impact of social support on breastfeeding practices vary according to culture and ethnicity (Daglas and Antoniou 2012; Giugliani et al. 1994).

3.6 Conclusion

This cross-sectional study of over 400 women in Nigeria shows that there are complex relationships between the different types and sources of social support and breastfeeding practices among women in north-central Nigeria.

Despite the limitations, our research findings highlight the significant dual roles (positive and negative) that social support from the older generations plays in the early initiation of breastfeeding by women in this region of Nigeria. Also, the protective influence of physical social support on the risk of pre-lacteal feeding by new mothers in this setting is another significant finding from our research.

The strong and powerful cultural influences that the older generations exert on pregnancy- and child nutrition-related issues in developing countries underscores the need to develop evidence-based, family-centered social support interventions targeted, especially, at the infant's grand-mothers and mothers-in-laws. This requires a multilevel and multi-sectoral approach that would target different barriers. Such intervention must incorporate strategies to create awareness, change attitudes, and eradicate deeply-rooted negative cultural beliefs and norms on breastfeeding through mass media campaigns, community advocacy, and training. At the same time, efforts should be made to ensure that health facilities in Nigeria adopt policies and provide a supportive environment and physical comfort to new mothers to guarantee early initiation of breastfeeding and avoidance of pre-lacteal feeding. Relatives and hospital staff should be encouraged to assist new mothers with physical support especially in the immediate postpartum period to allow the mothers enough time to rest and breastfeed. Moreover, health facilities could train family members and peers as informal breastfeeding consultants and counselors to help new mothers overcome initial difficulties with establishing breastfeeding.

Finally, more comprehensive, longitudinal or randomized controlled, multisite studies are needed to fully understand the specific association and the different mechanisms through which social networks and social support may affect breastfeeding practices among the different cultures and ethnic groups in Nigeria.

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Conclusions

Overall, there were little associations between parental social support and adolescent substance use or risky sexual behaviors in South Africa. Also, there were only mild associations between social support and breastfeeding practices among women in Nigeria. These findings have both research and policy implications.

First, more research utilizing multilevel longitudinal designs are need to investigate the determinants of risky health behaviors among adolescents and women in Sub-Saharan Africa. At the same time, research is needed to develop and validate culturally-appropriate social support instrument in Sub-Saharan Africa.

Second, policies and interventions to prevent risky health behaviors in Sub-Saharan Africa need to look beyond the individual, the family or friends. Resources should be dedicated to enforcement of regulations such legal minimum age, tobacco and alcohol ad restrictions and taxation of alcohol and tobacco products.

Finally, efforts should be made to reach out to the grass-roots through community-based advocacy to change attitudes and eradicate deep-rooted harmful cultural beliefs (e.g. male-child preference, gender-based violence, colostrum avoidance) that impact negatively on health behaviors. More programs to eliminate gender inequality in the social and economic spheres and more opportunities for women education and empowerment should be created by developing countries.