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Social Support And Reproductive Health In 15 To 24 Year Old Immigrant Latinas In The
San Francisco Bay Area

A Thesis Submitted to the
Yale University School of Medicine
in Partial Fulfillment of the Requirements for the
Degree of Doctor of Medicine

by
Ahou Meydani

2007

SOCIAL SUPPORT AND REPRODUCTIVE HEALTH IN 15-24 YEAR OLD
IMMIGRANT LATINAS IN THE SAN FRANCISCO BAY AREA.

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This study examines how social support is related to reproductive health risk among 15-24 year old immigrant Latinas residing in the San Francisco Bay Area. This is a cross-sectional, clinic-based study, composed of a sample of 68 immigrant Latina women, aged 15-24 (mean 18.7, S.D. 2.2), recruited from waiting rooms at two clinics in Oakland. Participants completed an interviewer-administered questionnaire and provided blood and self-obtained vaginal swab specimens to test for sexually transmitted infections. Three dimensions of social support were assessed: 1) functional support, using the Medical Outcomes Study (MOS) Social Support Survey; 2) structural support (quantity of support sources); and 3) social network characteristics. Primary reproductive health outcomes assessed included: 1) high risk sexual behaviors; 2) history of teen pregnancy and/or abortion; and 3) prevalence of Herpes Simplex Virus 2 (HSV-2), *Chlamydia trachomatis*, and *Trichomonas vaginalis*. Analyses examined relationships between social support measures and reproductive health behaviors and outcomes using multivariate logistic regression, adjusting for age, religiosity, length of stay in the U.S., and socioeconomic and marital status.

95.6% of participants were sexually active, with the mean age of sexual initiation being 15.6 years (S.D. 1.7). 30.8% had more than one sexual partner over the past year, 44.6% reported a teen pregnancy, and 12.3% had an abortion. Overall STI prevalence was 13.3%. Compared to those with lower support measures, participants with higher functional tangible support scores, as well as those who identified more people available for affectionate support and positive social interactions (structural support measures), were significantly more likely to have used condoms in the past year (adjusted odds ratios [A.O.R.s]: 2.31, 4.59, and 4.0, respectively, $p < 0.05$). Several measures of structural social support were protective against teen pregnancy: participants who identified more people they could count on for informational, affectionate support and positive social interactions, were less likely to have had a teen pregnancy (A.O.R.s: 0.27, 0.36, and 0.32, respectively, $p < 0.05$). Overall functional social support was protective against abortion (A.O.R. 0.16, $p < 0.05$). No significant associations were found between measures of social support and STI prevalence; however, a trend was noted whereby participants with higher measures of perceived functional support were more likely to have an STI. Social network characteristics found to be related to outcomes included gender proportions of the network and presence or absence of U.S.-born people in the network.

Several different dimensions of social support are associated with decreased risk of specific reproductive health behaviors and outcomes among young Latina immigrants. Use of a multi-dimensional social support instrument provides for richer analyses of these relationships, generating information that could be utilized for targeting support interventions and risk prevention in this population.

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INTRODUCTION

The population of Latino youth living in the U.S. has grown rapidly in recent years, accounting for 14.4% of the total U.S. youth population in 2000, and is expected to rise to 23.6% in 2025[1]. This population is largely shaped by immigration, with 18% of Latino elementary and high school students in the U.S being immigrants, 48% second generation, and the remaining third born to native-born parents[2]. Youth from each of these generations are exposed to economic, social and cultural factors that may influence their reproductive health behaviors and outcomes in different ways[3].

It is important to understand the factors that mediate adverse reproductive health outcomes such as teen pregnancy, abortion, and sexually transmitted infections (STIs) in adolescents, because they are more likely than adults to engage in risky sexual behaviors and have limited access to reproductive health care [4] . Young women are particularly vulnerable to adverse outcomes: despite being physically more affected by pregnancy and abortion, and physiologically more susceptible to STIs than males, they often have less power to negotiate safer sex practices[5, 6]. Latino teens are no exception. In fact, birth rates for Latina teens are 3 times higher than birth rates for non-Latina white teens, and 1.3 times higher than those for African American teens [7]; and Latinas are more likely than white teens to be diagnosed with chlamydia and gonorrhea, with adolescent Latinas being 6 times more likely than Latino males to be diagnosed with Chlamydia [4].

Research conducted among immigrant adult male Latino populations have demonstrated low levels of condom use, low safe-sex knowledge, and high-risk sexual

behaviors[8-12]. However, there is conflicting evidence in the literature as to whether or not this is true among young Latinas. Immigrant Latina youth may be at particular risk for risky behaviors and reproductive health outcomes, as they are more likely to be poor, have lower levels of education, and to live in less stable living environments than their U.S.-born peers. Some studies have demonstrated that youth who have spent less time in the U.S., or who are less acculturated, have the same[13] or higher [14, 15] rates of sexual activity or high-risk behavior (e.g. not using condoms) than those who are more acculturated. For example, while Mexican-born adolescents have lower rates of early sexual intercourse compared to U.S.-born Mexicans, they are also less likely to use contraception at first intercourse[16]. It has been postulated that the latter trend, as well as a decreased tendency to abort a pregnancy, explained the higher rates of early fertility observed in Mexican-born adolescents compared to US born Mexicans[17].

Conversely, other studies suggest that immigrant Latinas in the United States may be at lower risk for adverse reproductive health outcomes than their U.S.-born counterparts. For example, investigations of pregnancy outcomes among Latina women living in the U.S. have revealed what has been described as “an epidemiologic paradox”: despite lower socioeconomic status and poorer access to health care, immigrant Latina women tend to have better pregnancy outcomes than white, African American, and U.S.-born Latina women[15, 18-23]. Additionally, in a population-based study of young, lower-income women in Northern California, foreign-born women were found to have lower seroprevalence of HSV-2 compared to US-born women[8], and in other studies, lower acculturation (i.e. less time in the U.S.) was associated with later initiation of sexual activity and decreased non-marital births among youth [17, 24-28]. Though these

conflicting findings remains unexplained, epidemiologists have hypothesized that healthier behaviors among foreign-born, less acculturated women may be explained by factors such as protective cultural and religious values, or stronger social support among recent immigrants.

Lower levels of social support have been shown to predict a variety of high-risk behaviors[29] and mental health outcomes[30] among youth. In particular, some studies have shown higher social support to be related to increased “positive health practices”[31] [32], and decreased risky sexual behaviors[33-36], in youth. However, different forms of social support may influence health behaviors in teens in different ways. For example, in one study of urban African American adolescents, connectedness to friends was found to influence asymptomatic adolescents’ STI-related health care-seeking behavior more than closeness to parents [32]. Conversely, another study found that low familial support was associated with a prolonged interval from recognition of a problem and decision to seek care[37]. By identifying the types of social support that are protective among youth, we can develop more effective screening methods and interventions aimed at preventing adverse reproductive health behaviors and outcomes in this population. Unfortunately, little is known about how social support mediates high-risk reproductive health behaviors in young Latina immigrants. Furthermore, few studies [34] have examined the relationship between social support and actual (as opposed to reported) reproductive health outcomes in youth.

Despite evidence supporting a protective role for social support in mediating healthy behaviors and outcomes in youth, how social support influences reproductive health risk among immigrant Latina youth is poorly understood. Elucidating how

different aspects of social support uniquely influence reproductive health behaviors and outcomes in this population may help explain the selective vulnerability of Latina immigrants to certain adverse reproductive health outcomes. Furthermore, understanding the relationship between a multidimensional social support model and adverse reproductive health outcomes may provide new insights into targets for prevention. In this study, we sought to examine the relationship between three aspects of social support (perceived functional support, structural support, and social network characteristics) on behaviors (condom use, having multiple sexual partners) and outcomes (teen pregnancy, abortion, STI) among young Latina immigrants. In addition, we explored how characteristics of Latina immigrants' acculturation and migration experiences related to outcomes.

HYPOTHESES AND AIMS

Specific Aim I:

A. To examine how social support influences reproductive health risk among 15-24 year old immigrant Latinas residing in the San Francisco Bay Area. Specific reproductive health behaviors and outcomes of interest included:

- 1) Sexual behaviors (number of partners and condom use over the past year)
- 2) History of teen pregnancy and history of abortion
- 3) Prevalence of STIs (measured via biological testing): Herpes Simplex Virus 2 (HSV-2) seroprevalence (as a marker of long-term risk exposure); Chlamydia trachomatis and trichomonas vaginalis (*T. vaginalis*) prevalence (as markers of short-term risk exposure)

B. To evaluate the value and appropriateness of measuring 3 different dimensions of social support, (*functional support*, using the MOS Social Support Survey; *structural support* (quantity of social relations); and *social network characteristics*), for assessing reproductive health risk among young Latina immigrants.

Hypothesis Ia: We hypothesized that among 15-24 year old Latina immigrants residing in the San Francisco Bay Area, having lower functional and structural social support would be associated with higher risk sexual behaviors and thus an increased prevalence of HSV-2 seropositivity, Chlamydia trachomatis and *T. vaginalis* infection, and history of teen pregnancy or abortion.

Hypothesis Ib: We hypothesized that some social network characteristics would be associated with reproductive health behaviors and outcomes.

Specific Aim II:

To explore how migration and acculturation characteristics influence reproductive health risk among 15-24 year old immigrant Latinas residing in the San Francisco Bay Area.

Characteristics assessed included: language of preference (English vs. Spanish); length of time residing in US; age at migration; mode of crossing (with family/friends vs. alone); reason for migration; country of birth; and frequency of returning to country of birth.

Hypothesis IIa: Given the exploratory nature of this aim, we did not hypothesize about the direction of relationships: Among 15-24 year old Latina immigrants residing in the San Francisco Bay Area, acculturation factors (such as language of interview and length of time in the U.S.) and other migration characteristics that could influence risk (such as having crossed the border alone), would be associated with the reproductive health behaviors and outcomes assessed.

METHODS

A. Study Population

This is a clinic-based cross-sectional study of social support and reproductive health risks in young Latina immigrants. The target population for this study was immigrant Latina (female) adolescents and young adults aged 15-24 years residing or spending time in the San Francisco Bay Area. A convenience sample of all females attending a teen clinic and women's clinic that serve primarily Latino population in Oakland were recruited between April 5, 2006 and August 31, 2006. Inclusion criteria required that participants be female, aged 15-24 years old, self identify as of Latina ethnicity, born outside of the U.S., able to speak English or Spanish, able to give informed consent, and live in the San Francisco Bay Area. There were no exclusion criteria. As outlined in the introduction, our focus was on young Latinas due to the elevated rates of pregnancy and STIs in this population, which continues to grow faster than any other ethnic population or age group in the Bay Area. The study population was limited to immigrant young Latinas so as to better understand the variations of social support and reproductive health risk within the immigrant youth population.

B. Recruitment

Recruitment was conducted by four methods: 1) by bilingual research staff (Ahou Meydani and two research assistants, Tatiana Carranza and Katherine Sankey) directly approaching patients in the clinic waiting rooms 1-3 days per week; 2) by posting and handing out flyers with study contact information within the clinic and in local community agencies; 3) by allowing interested patients to leave their contact information with receptionists at the front desk; and 4) by clinic staff referral of interested patients.

Patients interested in participating in the study were screened for eligibility by research staff, provided information about the procedures of the study and about compensation for participation, and, if still interested in participating, were scheduled for a study visit on a date that was convenient for them. Of the 133 patients approached or contacted by the methods listed above, 116 were eligible for participation, 102 eligible patients agreed to participate, and 68 patients were enrolled, yielding a participation rate of 66.6% among those eligible. The 34 eligible and interested participants who were not enrolled did not show up to scheduled study visits (14 disconnected phone #'s/unable to re-contact, 10 changed their mind, 10 no reason/multiple no-shows). Of enrolled participants, 85.3% (n=58) were recruited from the teen clinic, 10.3% (n=7) from the women's clinic, and 4.4% (n=3) from other referral agencies. Approximately 56% of enrolled patients were approached/recruited by research staff, clinic staff, or community agencies, and the remaining initiated contact with us by leaving their information in a drop-box or by calling our staff phone line.

C. Study Encounter

All participants enrolled provided informed consent in their language of preference, completed a 25-minute interviewer-administered questionnaire, and provided biological specimens for STI testing. After completing the one-hour study visit, participants were compensated \$25 for participating, were provided with informational brochures related to STIs and birth control options, and were provided treatment and/or counseling by health care providers in the clinics if they tested positive for a STI. For all participants aged 18-24, and for all patients aged 15-17 who were visiting the clinic for reproductive health purposes at the time of recruitment,

written consent was obtained directly from the participant. In accordance with California Family Code (Section 6922), parental consent was not obtained from participants aged 15-17 who were visiting the clinic for reproductive health services at the time of recruitment. For all participants aged 15-17 who were visiting the clinic for reasons other than reproductive health care at the time of recruitment, parental verbal consent and participant written assent were obtained.

D. Questionnaire Design

The questionnaire was interviewer-administered, and provided in the participant's language of preference (English or Spanish). Questions related to demographics, socioeconomic status, religion, experiences migrating to the U.S., sexual and contraceptive use history, reproductive health history, and social network and social support systems. All questions were translated in Spanish and back-translated into English for consistency. The questionnaire was administered using the computer program Qgen, which allowed responses to be automatically entered into an Access database. This computer-based questionnaire was built by Ahou Meydani, with substantial technical support from Andrew High, of the UCSF Pediatric Clinical Research Center. Pilot-testing of the computer-based, interviewer-administered questionnaire was conducted by Ahou Meydani, in English and Spanish, using practice participants fluent in those languages. Once the final version of the questionnaire was completed, research assistants were trained in interviewing techniques, and were evaluated during mock-interview sessions to ensure consistency in responses.

E. Measures

The conceptual model guiding this investigation is adapted from the framework outlined by Berkman and Gliss depicting how social networks impact health (See Figure 1). The framework delineates a cascading causal process that begins on a macrosocial level and progresses to the psychobiological level and ultimately illustrates how many factors are dynamically linked together to affect health. Upstream (macro and mezzo) forces include socio-structural conditions (culture, socioeconomic factors, politics, etc), and social networks (social network structure, characteristics of network ties), which then mediate the more proximate, (downstream/micro) psychosocial pathways (social support, social influence, social engagement, etc) that impact behavior and health. Thus, potential interventions aimed at modifying behavior and health can be conceptualized to address risks by acting through specific pathways more proximate to biological outcomes. Our study focused on assessing one of the more proximate pathways (social support) and its relation to reproductive health behaviors and outcomes in young immigrant Latinas. However, more upstream forces (socioeconomic status, migration-related factors) and social network characteristics are assessed as well. Key predictor and outcome variables are described below.

Social Support (Predictor):

Social support, the main predictor of interest, was assessed in terms of *perceived* functional and structural social support. Perceived availability of support was chosen to be studied, as opposed to received support, because support received in a given time is confounded with need and may not accurately reflect the amount of support available to a person [38]. *Functional social support*, a more qualitative measure, is the degree to

which interpersonal relationships serve particular functions. *Structural social support*, a more quantitative measure, is the existence and quantity of social relationships, often measured as the existence of or contact with potentially supportive persons.

In this study, **overall functional social support**, as well as **sub-categories of functional social support**, were measured using continuous 5-point scales generated by the MOS Social Support Survey [38]. This is a validated instrument that was designed to qualitatively measure perceived availability of support among patients with chronic conditions, and has been used to show the positive impact of social support on health outcomes ranging from post-partum depression [39] to physical functioning among elderly with hip fractures [40]. It also has been used to screen for distress in cancer patients [41].

Structural social support was assessed by having participants identify initials of up to 20 people they considered “close friends and/or relatives”. This was defined as “people you spend your time with more than others, or who you depend on more than others.” As in the MOS Social Support Survey, the total number of people identified in their network of close friends and relatives was used as one measure of structural support. We also developed a new, more specific measure of structural support available to participants: we identified 5 questions from the MOS survey, each of which represented one of the 5 original social support subscales assessed by the survey (informational support, tangible support, emotional support, positive social interaction, and affectionate support), and had participants identify the initials of people in their network who they could count on for these specific types of support. For example, participants were asked to draw from their list of close friends and relatives, and to identify the initials of all the

people they could count on to take them to the doctor if necessary; the total number of initials was counted, thereby generating a structural measure of tangible support, which was analyzed categorically as having zero, one, or greater than one person a participant could count on for various types of support. In this way, structural measures of positive social interactions and informational, emotional and affectionate support were created, thereby allowing us to compare the differing effects of quantitative (structural), versus qualitative (functional) measures of specific perceived social support domains on reproductive health risk.

Social network characteristics, also, arguably, structural support measures, were collected for each of the people identified in participants' network of close friends and relatives. This information provided data on the size and demographic characteristics of participants' networks (in terms of age, sex, relationship, and whether people were born or live in the U.S.) and also allowed us to utilize the social network characteristics data to create a much richer analysis of structural support. For example, we could analyze not only how many people a participant identified as close friends and relatives, but also: whether or not the people she considered "close" included a sex partner; what proportion of these people were family versus friends; what proportion live in the U.S., or were born in the U.S. The complete social support assessment described above can be found in the Appendix. Spanish translation is available upon request.

High-risk Reproductive Health Behaviors and Adverse Outcomes (Outcomes)

Sexual behaviors of interest included: whether or not the participant used condoms during sex at all over the past year, and whether or not she had multiple (>1)

sexual partners over the past year. **Adverse Reproductive Health Outcomes** included: whether or not the participant had been pregnant as a teen (age <18), whether or not she had had an abortion, and presence or absence of HSV-2 seroantibodies, Chlamydial infection, and/or trichomonas infection.

Potential Confounders:

Age (years), SES (high/low: low SES=lives in crowded housing, defined below), religiosity (high/low: high religiosity=attends services at least once per week), marital status (married: yes/no), and acculturation characteristics such as language of preference (Spanish/English) and length of time in the U.S. (years) were assessed as potential confounders. Because the target population included adolescents and young adults, who often are unaware of household income level[42], socio-economic status was assessed by other standard measures, including ratio of people in household to bedrooms (crowded housing is considered >2 people per bedroom[43], and level of educational achievement attained by participants' mother and father. Due to the high prevalence of "unknown" responses for the parental educational achievement, we excluded this measure from analyses.

Migration and Acculturation Characteristics (Exploratory Variable)

Migration questions included age of migration, reasons for migrating, with whom the participant migrated, number of family members in the U.S., country of origin and whether or not the participant had returned to her country of origin. Immigration status was not assessed. Language of interview and length of time residing in the U.S. were measured as indicators of acculturation.

F. STI Testing and Reporting

Participants provided two vaginal self-swabs and one blood sample to test for chlamydial infection, trichomonas, and HSV-2, respectively. Blood was drawn via venipuncture by research staff (Ahou Meydani and Tatiana Carranza) who completed a course that met the certification requirements for phlebotomy in a clinic that is not a licensed clinical laboratory or public health department. Blood samples were refrigerated immediately after venipuncture and delivered weekly to the San Francisco Department of Public Health (S.F.D.P.H.) Laboratories where they were tested for HSV-2 serum IgG antibodies using HerpeSelect 2 ELISA IgG (Focus Technologies). Research staff were trained by the S.F.D.P.H. on methods for instructing teen patients on the proper acquisition of self-obtained vaginal swabs and on proper handling of specimens. All participants were provided verbal as well as visual instructions on how to collect vaginal self-swab samples and did so in a private bathroom in one of the clinics. For each patient, one of the vaginal self-swabs was delivered to the S.F.D.P.H. laboratory where it was tested for chlamydia using commercially available DNA amplification. The other vaginal self-swab was tested onsite for trichomonas vaginalis, by trained research staff, using the CLIA-waived OSOM Trichomonas Rapid Test (Genzyme Diagnostics), according to the manufacturer's protocol. Specimens were collected from all participants regardless of sexual activity.

Results of STI testing were provided to patients as soon as they were available, with appropriate recommendations for follow-up and treatment given to those with positive results. Treatment was provided free of charge by the San Francisco

Department of Public Health to patients who ultimately tested positive for Chlamydia or trichomoniasis.

G. Statistical Analyses

All statistical analyses were performed by Ahou Meydani, using STATA 7.0, with guidance from Alexandra Minnis and John Neuhaus (biostatistician for the UCSF Pediatric Clinical Research Center).

Development of Functional Social Support Scale Variables: Multitrait and Factor Analyses

The MOS Social Support Survey includes 19 items, each of which were designed to measure one of five different aspects of *functional* social support: tangible (assistance with tangible needs such as performing chores, getting to appointments, making meals), informational (offering advice, information, guidance or feedback), emotional (expression of positive affect, empathetic understanding, encouragement of expression of feelings), affectionate (involving expressions of love and affection) and positive social interaction (availability of others to do fun things with you). Responses to questions were based on a 5-point Likert scale. Analyses were performed using an overall social support index scale, which is a sum of responses from all 19 items, divided by 19, so that the scale ranged from 1 (lowest support) to 5 (highest support). Analyses were also performed using thematic subscales, based on 4 tangible support questions, 4 informational support questions, 4 emotional support questions, 3 affectionate support questions, and 4 positive social interaction support questions.

In order to confirm applicability of the MOS Survey's individual questions and subscales to our population, we used our data-set to test item variability, and performed

multitrait correlation and factor analyses, which demonstrated inter- ($\text{corr} < 0.7$) and intra- ($\text{Cronbach alpha} \geq 0.79$) subscale correlations, and item-subscale correlations ($\text{corr} > 0.65$) similar to those described by the authors of the survey (see Table 1). As the authors of the MOS Survey found [38], our multitrait and factor analyses supported combining the 4 items in the emotional and the 4 items in the informational themes, as responses to these two subscales correlated highly (0.7557), to form a combined, 8-item Emotional/Informational Support (EMI) subscale. These analyses also supported dropping one of the items from the positive social interactions (PSI) subscale (“how often do you have someone to do things with to help you get your mind off things?” as the PSI subscale including this item (PSI-1) correlated highly ($\text{corr} = 0.7014$) with the EMI subscale, whereas the PSI subscale excluding this item (PSI-2), did not ($\text{corr} = 0.6461$). Therefore, similar to the authors of the MOS Survey, we used the PSI-2 subscale, which contains only 3 items, in analyzing relations with outcomes.

The authors of the MOS Survey recommend analyzing the index scale and subscales as means of continuous variables. We analyzed the scales as both continuous measures, as well as dichotomous measures (by creating variables in which “high social support” is a scale score > 3 , and “low social support” is a scale score ≤ 3). In preliminary analyses, trends in associations did not vary between the two variables (continuous and dichotomous), so, given the somewhat arbitrary cut-point for the dichotomous variable, we decided to use only continuous social support scales variables in subsequent analyses.

Imputation of Missing Values

Because of the importance of the functional social support scale for testing our main hypothesis, imputation methods were used to replace 4 social support response values that were coded as “don’t know” from 3 participants’ interviews (one participant responded “don’t know” to two of the social support scale questions). Imputed values are predictions of what participants’ most likely answers would be, assuming that they would respond in patterns similar to their peers. Because we had confirmed in our earlier analyses that items within the social support subscales were highly correlated, we reasoned that subscale items would be appropriate variables upon which to base the imputation. Imputation was performed by: first, creating regression models (STATA command: “reg”) based on the subscale items, using responses from the participants with complete social support scale data, and then next, by predicting (STATA command: “predict”) the missing value of interest by fitting that participant’s responses to the regression model. For example, if a participant was missing a response for the question, “how often do you have someone to help you with chores?” a regression model would be created using the 4 tangible support subscale items (which includes the question related to chores), and then that participant’s values (for the 3 non-missing items) would be placed into the regression equation in order to determine the predicted value of the missing item. By using imputation to replace these 4 missing values, we were able to analyze our major predictor variables (the 19-item functional social support scale and its subscales) for all 68 participants, thereby maximizing our sample size for the purpose of testing our hypothesis.

Development of Structural Social Support and Network Characteristic Variables

All structural social support variables (total number of close friends and relatives, and number of close friends and relatives participants could count on for positive social interaction and informational, tangible, emotional, and affectionate support) were generated as continuous variables by summing the number of initials identified for a particular measure. Because the measures representing the sub-categories of structural support were not normally distributed, we converted these to categorical variables (0, 1, and >1 people) in order to make the analysis more meaningful.

Variables describing the characteristics of participants' networks of close friends and relatives were created by dividing the number of people in a participant's network with a certain characteristic (e.g. male) by the total number of people in her network. Thus, variables were created describing the percentage of males (vs. females), friends (vs. relatives), people born in the U.S., people living in the U.S., and people identified as boyfriends or sex partners, for each participant's network. For some measures, binary variables were created to indicate presence of particular characteristics, such as whether or not a boyfriend or sex partner was identified in the participant's network.

Descriptive Statistics

Means and standard deviations of all continuous, normally distributed variables were computed. For skewed, or non-normal distributions medians and inter-quartile ranges (IQRs) were calculated. Frequencies of categorical variables were computed. Given the low number of participants testing positive for chlamydia and HSV-2, further analyses of these outcomes were conducted using an overall measure of STI exposure, which was created by combining these two outcomes into one variable.

Bivariate Analyses

Associations between predictors and outcomes were explored using Pearson's chi-square statistic for categorical factors; Fisher's exact test for categorical factors in cases where cell numbers were low (<5); and ANOVA and t-tests for differences in means. Associations were considered significant at $p < 0.05$. Regression models were first constructed to assess the bivariate association between social support variables and reproductive health behaviors and outcomes. Odds ratios (O.R.) were used to assess the magnitude of the associations, and 95% confidence intervals (C.I.) and p-values were computed to assess statistical significance.

Bivariate (Chi-square) analyses of the categorical structural support variables (how many people participants could count on for the different sub-types of social support: 0 people, 1 person, >1 person) with outcomes of interest revealed some category cells with zero counts. As such, we could not assess the relationships with outcomes using indicator variables with one group designated as baseline. Rather, we treated the exposure as a count. Although these odds ratios should not be interpreted as reflecting equal incremental changes in exposure, the magnitude of the effect estimates mirrored the overall trends noted in Chi-square analyses. The categories do reflect increasing levels of structural support, even if the magnitude of difference in support may vary between categories.

Multivariate Analyses

Predictor-outcome associations that were significant in bivariate analyses were then selected for multivariate analyses. Variables including age, SES (crowding), length of time in the U.S., language of interview, marital status, and religiosity were added to

regression models individually, to test for confounding. Those variables that affected models significantly were added selectively to models to create adjusted odds ratios (A.O.R.), C.I., and p values.

Measures excluded from regression analyses. Several reproductive health behaviors and outcomes were excluded from regression analyses, as they demonstrated significant associations with no, or few (<3), of the social support variables. These outcomes included: whether the participant used contraception at first intercourse; whether she had sex before the age of 15, how many sexual partners she had in her lifetime, how many partners she had in the past 3 months, whether she had ever been tested for HIV, whether she had ever been pregnant, and whether she had had a miscarriage.

All procedures and documents used in the study were approved by the institutional review boards at UCSF (Committee on Human Research) and at Clinica de la Raza.

RESULTS

Descriptive Characteristics

Demographic and migration characteristics of the study sample are displayed in Table 2. Mean age of participants was 18.7 years ($SD=2.2$), with 88.2% being less than 21 years old (median: 19; IQRs: 15-17; 17-19; 19-20; 20-25, age in years). The majority of participants lived in households receiving government benefits, and significant proportions lived in crowded housing conditions, and/or were neither attending, nor had graduated from, high school. The vast majority of participants identified themselves as Catholic, though less than 15% attended services regularly.

The sample was primarily composed of Mexican-born participants, though other birth countries (Honduras, Guatemala, El Salvador, Peru, Ecuador, Chile, and Puerto Rico) were represented as well. Most migrated with family members and about 16% migrated alone. On average, participants migrated at age 10.6 years ($SD=6.5$), though age at migration was distributed broadly (median: 12; IQRs: <1-3.5; 3.5-12; 12-17; 17-21, age of migration in years). The majority of participants chose to conduct the interview in Spanish.

Table 3 describes the prevalence of high-risk sexual behaviors and outcomes among participants. Almost all participants reported having had vaginal or anal sex in the past, with most having initiated sex in their teens. Risky sexual behaviors and outcomes were prevalent in the sample; while a high percentage of sexually active participants reported having used condoms during sex over the past year, less than half said they used protection more than half of the times they had sex. Almost a third of participants had more than one sexual partner over the past year, with the average number of lifetime

partners approaching three. While about 10% of participants were married at the time of interview, nearly 45% had been pregnant as a teen, and 12.3% had had an abortion. No participants tested positive for trichomonas. Five participants tested seropositive for HSV-2, and three tested positive for chlamydia. Eight patients were not tested for HSV-2 seroprevalence due to difficulties encountered during venipuncture (difficult veins or inadequate specimens). Due to the small number of positive results, chlamydia and HSV-2 results were combined to give an overall STI prevalence. Percentages of HSV-2 seropositives and overall STI positives were calculated based on a sample size of 60, which excludes those not tested for HSV-2. No participants were co-infected, and all those who tested positive for chlamydia had completed HSV-2 testing and were negative.

Social Support and Reproductive Health

A. Bivariate Analyses

Several dimensions of social support were found to be associated with the outcomes of interest: condom use over the past year, multiple sexual partners over the past year, history of teen pregnancy, history of abortion, and STI exposure. The unadjusted odds ratios which express the relationship of social support variables with these outcome variables are displayed in Table 4A. Bivariate frequencies and Chi Square analyses for the relationships between structural support measures and the two outcomes associated with these variables (condom use over the past year and history of teen pregnancy) are displayed in Table 4B. For the most part, higher functional and structural social support was associated with less risky behaviors and outcomes, though an important exception to this trend was noted for STI exposure. The size of the social network (total number of close friends and relatives) was unrelated to the reproductive health outcomes studied.

Risky behaviors

In this sample of young Latina immigrants, every one point increase on the *functional* tangible support scale was associated with an almost two-fold increased odds of reporting having used a condom in the past year. Similarly, a participant being able to identify more people she could count on to show her love and affection (*structural* measure of affectionate support) and with whom she could have a good time (*structural* measure of positive social interactions) were associated with 4-fold increased odds of using condoms in the past year. This trend can be observed in Table 4B: the proportion of participants who reported using a condom increases as the structural support categories increase from 0, to 1, to >1 people identified (p=0.009; 0.005 for affectionate support and positive social interaction, respectively).

For every one-point increase in *functional* affectionate support, participants were over a third less likely to have had multiple sexual partners in the past year.

Teen pregnancy and abortion. Several measures of *structural* social support were protective against teen pregnancy; participants who identified more people they could count on to provide them with good advice, to have a good time with, and to show them love and affection were less likely to have had a teen pregnancy (unadjusted O.R.[95%CI]: 0.29 [0.12-0.73], 0.32 [0.12-0.83], 0.36 [0.14-0.92], respectively).

Overall *functional* social support, as well as functional social support sub-categories, (tangible support, emotional/informational support, and affectionate support) were protective against abortion (unadjusted O.R.[95%CI]: 0.25 [0.09-0.71], 0.16 [0.05-0.51], 0.28 [0.1-0.75], 0.49 [0.24-0.995], respectively).

STI exposure. In contrast to the self-reported behaviors and outcomes, participants with higher overall, emotional/informational and positive social interaction *functional* support were more likely to have tested positive for HSV-2 or Chlamydia, though this relationship was only statistically significant for emotional/informational functional support (unadjusted O.R.[95%CI] 3.9 [1.01-14.97]).

B. Multivariate Analyses

For the most part, multivariate adjustment for sociodemographic characteristics and acculturation-related factors had minimal effects on the associations between the measures of social support and the reproductive health risks. Age, marital status, and religiosity, were not independently associated with any of the outcomes, and, therefore, did not meet criteria to be examined as confounding factors. Crowded housing increased the odds of teen pregnancy (O.R. 2.73 [0.99-7.48] and decreased the odds of having multiple partners (O.R. 0.33 [0.08-1.05] and of using condoms (O.R. 0.34 [0.09-1.22], though these associations did not achieve statistical significance. Language of interview (O.R. 9.33 [1.59-54.67] and number of years living in the U.S. (O.R. 1.17[1.02-1.34]) were associated with abortion. Because language of interview correlated strongly with number of years living in the U.S. (corr=0.7), we decided to use only one of these variables (language of interview) in the multivariate models. The effects of adjusting for crowded housing and language of interview on the relationships between social support and reproductive health risk, can be observed in the adjusted odds ratios presented in Table 4A. Adjusting for crowded housing generally had the effect of strengthening the protective effect of social support on STI exposure, teen pregnancy, and condom use, while weakening the protective effects of social support on abortion. Adjusting for

language of interview mainly had the effect of diminishing the positive association between functional social support measures and STI exposure, making these relationships non-significant. Adjusting for language of interview also enhanced the protective association between social support and abortion. Despite these adjustments, most of the associations described in the bivariate analyses remained stable, with only a few becoming non-significant as a result.

C. Social Network Analyses.

Table 5 describes the associations found between participants' network characteristics and reproductive health risks.

It is possible that identifying at least one U.S.-born person in the participant's network of close friends and relatives reduced the odds of being STI-positive (O.R. 0.11 [0.01-0.99]) though this relationship was not statistically significant in multivariate analyses. Similarly, identifying at least one boyfriend or sex partner as being a close friend or relative may reduce the odds of being STI-positive, though this relationship did not achieve statistical significance (A.O.R. 0.21 [0.04-1.06]). To explore the latter finding further, we looked at each STI independently, and found that none of the participants who tested positive for Chlamydia (n=3) identified a boyfriend or sex partner in their network of close friends and relatives (Chi-square p=0.024). Though identifying a boyfriend or sex partner was also not significantly associated with the other outcomes, there was a general trend towards it being associated with protective behaviors and outcomes, with some associations (less likely to have had multiple sex partners, less likely to have had an abortion) having $p < 0.1$.

Having more than 15% of one's close network be male (which corresponds to being in the upper three quartiles for proportion of network being male) was associated with being less likely to have had multiple partners in the past year (A.O.R 0.23 [0.07-0.78]). Also, increasing the percentage of the close network who were friends (as opposed to relatives) corresponded with slightly increased odds of having used a condom the past year, and of having had an abortion, though both relationships became non-significant after adjusting for language of interview and crowding. Having $\geq 75\%$ of one's network living in the U.S. (corresponding to being in the upper three quartiles of responses for proportion living in the U.S.) was not associated with any of the outcomes measured (data not shown).

Acculturation and Migration and Reproductive Health

Unadjusted odds ratios of associations between acculturation and migration characteristics and reproductive health behaviors and outcomes are presented in Table 6. Abortion was the only outcome that was associated with these characteristics. Factors suggesting greater exposure/affiliation to U.S. culture (having spent more years in the U.S., having migrated at a younger age, and choosing to speak English for the interview) all increased the likelihood that a participant had had an abortion. Language of interview was the strongest, most significant predictor of abortion, with those who spoke English being over nine times more likely to have had an abortion, compared to those who spoke Spanish (O.R. 9.33 [1.59-54.67]). Though not significant, having ever returned to their birth country, a variable suggesting greater exposure/affiliation to birth country culture trended towards association with having had a teen pregnancy.

DISCUSSION

This study investigated the relationships between three aspects of perceived social support (functional social support, structural social support and social network characteristics) and risky reproductive behaviors and outcomes among young Latina immigrants attending clinics in the San Francisco Bay area. We found that each aspect of social support assessed was inversely associated with different adverse reproductive health outcomes in this population: 1) functional social support was inversely associated with having had an abortion; 2) three dimensions of structural support (informational, affectionate and positive social interactions) were inversely associated with history of teen pregnancy; and 3) identifying at least one U.S.-born person as a close friend or relative (a network characteristic) was inversely associated with STI prevalence. Relationships between the social support measures and risky sexual behaviors were less consistent in terms of which aspects of social support appeared to influence them, but those individual dimensions of social support which were significantly associated with condom use in the past year indicated that higher social support indices were related to increased odds of condom use.

Social support and risky sexual behaviors

Initial studies investigating the relationship between social support and HIV sexual-risk behaviors were conducted primarily in men who have sex with men and female intravenous drug users. These studies revealed inconsistent findings, with some indicating a protective association between social support and condom use, and others finding no association [44]. Recognizing the increasing risk for HIV infection among minority adolescents, a few studies have attempted to understand the socio-cultural

context of risky behaviors in youth by investigating the relationship between social support and sexual risk behaviors in these populations. These studies suggest a protective role for social support in the predominantly African-American populations they examined; St. Lawrence et al[33] found that among 295 African American youth (aged 13-18) recruited from a community health center, those who reported lower perceived social support (measured via the Social Provision Scale, a multidimensional perceived social support instrument), held more negative attitudes toward condoms, had less self-efficacy, and were more likely to engage in casual sex, have sex with non-monogamous partners, and be coerced into unwanted sexual activity, compared to those with higher perceived social support. Similarly, in a sample of 403 mostly (70%) African American urban women aged 14-25, lower perceived social support (assessed via a 5-item Perceived Social Support Scale) was associated with having multiple sexual partners in the past year, not using condoms consistently, and having condom use problems, after adjusting for race and type of health insurance [35].

In contrast, a study of 116 predominantly African American, sexually active 14-21 year old girls attending an urban hospital-based adolescent clinic, found that neither family nor peer social support (assessed via the Multidimensional Scale of Perceived Social Support) were associated significantly with protective sexual behaviors [34]. However, both family and peer social support were associated with self-esteem, and self-esteem was associated with safe sexual behaviors, suggesting, indirectly, a protective relationship between perceived social support and safer behaviors. Thus, for the most part, studies conducted with primarily African American urban youth suggest

that those with lower perceived social support are more likely to engage in riskier behaviors.

This is the first study to investigate the relationship between social support dimensions and risky behaviors in young Latina immigrants. In this study, 18.5% of the sexually active participants reported they never used condoms during sex over the past year. While overall perceived social support was not associated with condom use, we found that participants who reported higher perceived tangible support, as well as those who identified more people they could count on to provide them with affectionate support and opportunities for positive social interactions, were more likely to have used condoms at least once over the past year. Previous studies examining the relationship between perceived social support and risky behavior did not distinguish between the different dimensions of social support in their analyses. Our finding that higher functional (but not structural) tangible support predicted condom use suggests that condom use in this population may be supported by a generally stronger qualitative perception of access to services and material goods, but is not necessarily related to the number of people available to provide this support. Perhaps having at least one person who can be strongly depended upon to assist them with tangible needs (such as transportation, money, child care) could increase young Latina immigrants' access to condoms through increased financial resources. An alternate explanation could be that having increased perceived levels of this type of tangible support could alleviate stress in these women, thereby enhancing self-efficacy in negotiating condom use.

Whereas the number of people available for tangible support was not related to condom use in this sample, we did find that the structural measures of affectionate

support and positive social interactions were positively associated with condom use in the past year. The influence of these measures of available support on condom use could potentially be mediated by self-esteem, as those who perceive having more people available to show them affection and with whom they can socialize may have higher self-esteem and self-confidence, and thus be more able to negotiate condom use during sex. Alternatively, having larger support networks for affection and socializing may indicate that these women are less socially isolated, and possibly exposed to more sources of ideas related to acceptability of condom use.

Behavioral norms within a social group have been shown to assume an important role in influencing behavior in youth [45]. In this study we examined characteristics of participants' social networks and hypothesized that characteristics which implied a more traditional Latino influence and social structure (lower percent U.S.-born members and higher percent family members) would be associated with lower likelihood of condom use. However having a higher percent of the network being friends was only marginally ($p < 0.1$) associated with condom use, and though having at least one U.S.-born member as a close friend or relative increased the likelihood of having used condoms, this relationship was not significant. Still, given the small sample size and exploratory nature of this study, these preliminary findings suggest that the interactions between availability of support, acculturation characteristics of the support network, and condom use warrant further investigation.

Interestingly, in a study investigating social support (assessed via an instrument that measures overall perceived source-specific social support for tangible aid and guidance) and high-risk sexual behaviors among 187 slightly older (aged 18-35) Puerto

Rican women attending health clinics, perceived social support from neither family nor friends was associated with condom use. In fact, unprotected vaginal sex was found to be associated with *higher* perceived social support from a boyfriend or husband. The authors hypothesized that higher perceived tangible aid and guidance from a partner may have created a context for greater dependence on the partner, which may in turn have negatively affected self-efficacy in negotiating condom use [44]. We did not analyze source-specific social support, but we did assess whether or not a sexual partner was identified as a close friend, one indication of general perceived availability of support from a partner. Identifying a partner as a close friend was not associated with decreased likelihood of condom use in our sample. In fact, though non-significant, it trended toward being a positive relationship. Given the capability of our social support instrument to assess source-specific support, we expect future analyses with the data set to explore this relationship in further detail.

The only social support measure significantly associated with having had multiple sex partners in the past year was lower *functional* affectionate support. Despite retaining its direction, this association became non-significant when adjusted for language and SES. No other measures of functional or structural support, including the number of people available for affectionate support, predicted monogamy. Perceiving higher availability of dependable affectionate support from a few close friends and/or relatives may discourage young Latina immigrants from engaging in sex with multiple partners. Those young women who mentioned a partner as being one of their close friends were less likely (A.O.R. 0.39, $p < 0.1$) to have had multiple partners in the last year, suggesting in this case that being close with a partner could be important for

encouraging monogamy. On the other side of the spectrum, those perceiving less dependable availability of affectionate support may pursue relations with multiple partners in order to seek greater affection. Again, this could be mediated by self-esteem. But perhaps the relationship is bidirectional, as being in a stable, monogamous relationship likely provides an environment more conducive to receiving affectionate support than being in less stable relationships with more than one person.

Another finding of note is that the young women with a lower proportion of men in their network of close friends and relatives were more likely to have had multiple partners in the past year. This is somewhat counterintuitive, as one might think that being close with more men might lead to having more sexual partners. But it could suggest that being more familiar with men, and interacting with them more as friends may predispose to relationships based on friendship and respect, and less around sex.

Social support and teen pregnancy

Latina youth are at high risk for teen pregnancy. Compared to non-Latina white women (27.4), and African-American women (64.7), Latinas (82.3) have the highest birth rates (per 1000 women aged 15-19) in the U.S. [7]. In 2003, seventy percent of teen births in California were to Latinas [46], The numerous adverse consequences of teen pregnancy, including lower educational attainment and persistent poverty [47-49], make identifying the determinants of teen pregnancy among Latinas essential.

In this study, young Latina immigrants who had more people they could count on for informational support (people to give them advice they really wanted), affectionate support, and positive social interactions, were significantly less likely to have had a teen pregnancy. Similar trends were noted for the number of people available for tangible

and emotional support, though these relationships were not significant in multivariate analyses.

Given the cross-sectional nature of the data, and the fact that we measured history of teen pregnancy rather than current teen-pregnant status, it is unclear whether lower social support leads to teen pregnancy, or whether people who had teen pregnancies are predisposed to feeling less supported. No studies have prospectively examined this relationship; however, Longsdon and Koniak-Griffin[50] outlined a theoretical model for the latter explanation, suggesting several barriers to obtaining social support that adolescent mothers may face, including: stigma, environment, conflict with support providers, unmet expectations of reciprocity, and lack of social skills needed to ask for support and to interest others in providing support. By assessing and addressing social support in pregnant teens, providers can play a role in improving outcomes [50]; professional support has been shown to be effective in helping adolescents delay subsequent pregnancies and stay enrolled in school [51]. In addition, home visitations designed to enhance the material and social environment of the family have been shown to improve parental care of the child, decrease subsequent pregnancies, and increase employment rates among post-partum adolescents[52]. Regardless of the direction of the relationship between social support and teen pregnancy, it is important to assess support in people who have had teen pregnancies, as lower support is associated with depression [53], poorer parenting behavior [12, 54], and decreased maternal-fetal attachment [55] in post-partum adolescents.

Social support and abortion

We found that the young Latina immigrants who had stronger perceived overall, tangible, and emotional/informational *functional* support were significantly less likely to have had an abortion in the past. Functional affectionate support also demonstrated an inverse relationship with abortion history, but this was not significant after adjusting for language and crowding. Interestingly, all of the dimensions of structural support (number of people who could be counted on for support) were also inversely related with abortion history, although none of these relationships were significant.

One explanation for these findings is that young women who reported perceiving weaker social support were less confident that they would have the tangible, emotional and information resources necessary to raise a baby, and thus decided to abort. This feeling could be particularly relevant if there was a perceived lack of support from her partner. Analysis of the network characteristics in this sample support this idea; not identifying a sexual partner as being part of a participant's close friends and relatives network was associated with having had an abortion ($p < 0.1$), suggesting that lack of closeness to or unavailability of a partner could be related to decision to abort. Indeed, in a study of prenatal women in New Orleans, in addition to identifying factors commonly found to influence the decision to abort (such as cost, readiness, not wanting any more children, marital status), indicators of partner support and stability of support (not being in a relationship, and not reporting that a partner wanted a baby or that they wanted a baby with their partner) were associated with choosing to abort [56].

Support from family may be influential in the decision to abort as well. Bracken et al[57] found that among women with unexpected pregnancies, those who chose to

carry a pregnancy to completion had more support from both partners and family than those who chose to abort. In our study we found that there was a negative relationship between the percentage of a young woman's network that is relatives (as opposed to friends) and history of abortion. A higher percentage of the network being friends may indicate relatively less reliance on the family members for support, which could be a precipitating factor for abortion, or alternatively, could be a consequence of having had an abortion. As with history of teen pregnancy, the direction of influence of these relationships is unclear. Few studies have formally investigated how social support is related to abortion, and those that have, have primarily focused on how social support levels prior to abortion influence mental health outcomes after abortion [57-59], rather than either perceived social support's influence on the decision to abort, or the influence of having had an abortion on subsequent perceived social support levels.

Having a greater percentage of the network be friends rather than relatives may also indicate a less traditional social network structure, which is likely to be associated with increased risk of abortion. Studies investigating the factors influencing the decision to abort in adolescent Latinas have shown that country of origin [17, 60] and acculturation [61] predict abortion, with Mexican adolescents being less likely to have an abortion compared to Puerto Ricans, Cubans [60] and Whites [17], and less-acculturated Latino adolescents and Mexican-born adolescents being less likely to have an abortion compared to more acculturated Latinos [61] and U.S.-born Mexicans [17]. Though prevalence of anti-abortion sentiments were relatively high among a sample of adult Latinos, factors influencing the attitude towards abortion have been found to be similar to those in Whites; higher education, higher SES, lower religiosity, female gender, feminist

and liberal ideologies, and Cuban as opposed to Mexican country of origin all predict acceptance of abortion [62]. Among 14-24 year old pregnant Latinas attending Los Angeles family planning clinics, less traditional attitudes about women's roles, higher gravidity, shorter periods of sexual activity, and higher number of lifetime partners predicted history of abortion [61]. Taken together, these data suggest that young Latina women with more traditional attitudes, who are less acculturated, are less likely to abort. Our study of foreign-born young Latinas supported this relationship, as both length of time in the U.S., as well as language of interview being English, were significantly positively associated with history of abortion.

Social support and STIs

Based on our theoretical model (Figure 1), we hypothesized that having higher perceived and actual social support would encourage less risky sexual behaviors, thereby reducing Latina immigrants' risk for being STI positive. Though some aspects of higher perceived and actual social support, particularly those related to affectionate support, were significantly associated with less risky behavior (reported use of condoms in the past year, not having multiple partners in the past year), these social support measures did not protect against STIs. In fact, for several dimensions of perceived functional support, higher support appeared to increase a participant's odds of having an STI. These associations became non-significant after adjusting for SES and language of interview, but the direction of the relationship remained strongly positive.

Mazzaferro et al[35] found that low levels of perceived social support were associated with high-risk behaviors and reported past history of STI in a sample of young, urban, primarily African American women. However, as in our study, she found that perceived

social support was not significantly associated with current infection with Chlamydia or gonorrhea (tested from self-collected vaginal specimens). This suggests that past STI could have influenced current perceived social support, but that, in this population, current perceived support did not exert an influence on prevalent STI. Of note, in our sample, there was also no relationship between the number of people identified as being available for support and STI positivity (structural support was not associated with STIs).

Among young Latina immigrants, from *whom* a woman receives support, as opposed to *how much* support she feels she has, may be more important for determining STI risk; our social network analyses indicated that those who identified a boyfriend/husband/sex partner as being a close friend were much less likely to have a STI ($p < 0.1$), particularly if the STI considered was Chlamydia ($p < 0.05$). Surprisingly, we also found that those who identified ≥ 1 U.S.-born person as a close friend or relative were much less likely to have a STI ($p = 0.054$) than those who did not. These findings suggest that availability of social support from a partner or from more acculturated individuals could be more indicative of STI-risk and ability to negotiate protective behaviors than general perceptions of social support, though larger studies are needed to verify these preliminary results. This highlights the potential value of including social network characteristics in theoretical models of STI acquisition, an outcome dependent on both individuals' attitudes and behaviors, and those of their sexual partners.[63]

Value of a multidimensional social support assessment for understanding reproductive health risk in this population

In this study we assessed perceived social support in terms of perceived dependability of available support (functional support) and perceived quantity of

available support sources (structural support). Furthermore, we characterized the nature of relations and the demographic features of people identified as women's support sources (social network characteristics). Using this multidimensional assessment of social support allowed for a richer understanding of how social relationships influence reproductive health risks in young Latina immigrants and captured relations that would have been lost with a one-dimensional instrument.

Though the majority of studies investigating the relationships between social support and health have relied on only functional support measures [64], several studies have argued a need for understanding the availability of sources of support and types of sources of support, in addition to the strength or quality of perceived support [29, 38, 39, 64]. Our study supports this argument. The addition of structural support measures and network characteristics allowed us to capture important relationships between social support and teen pregnancy, condom use, and STI acquisition that would have been missed by assessing functional measures alone.

Structural measures of social support have been assessed in a variety of ways [29, 38, 39, 42, 64]. Although the MOS Survey includes one measure of structural support (the total number of close friends and relatives available) and has been found to predict depressive symptomatology among post-partum urban women [39], in our sample, this measure was not related to any of the behaviors or outcomes of interest. However, by adapting some of the MOS Survey questions to create support sub-type-specific measures of structural support (e.g. the number of people depended upon for tangible support), we were able to quantify availability of sources for specific types of support. This proved more meaningful than the overall count of close friends and relatives for analyzing

relations with reproductive health risk in our study's population. For example, with this data it was possible to determine that the number of people available to provide affectionate support is more predictive of condom use over the past year in this population than the number of people available for informational support. This may indicate that people depended upon for love have greater influence on condom use than people relied upon for information/advice. This information could potentially be useful when trying to determine how to reach teens effectively with prevention messages.

The major advantage of adding measures of structural support, though, is the ability to compare the selective advantages and disadvantages of quantity versus quality when it comes to social support's influence on health outcomes. For example, people who had higher perceived *functional* affectionate support were significantly less likely to have had multiple sex partners within the last year. However, there was no association between the number of people identified to provide affectionate support (*structural* affectionate support) and likelihood of having multiple sex partners. The first measure gives us a sense of the strength or quality of the support they receive, regardless of whether the support is coming from 1 person or many. The second measure gives us a sense of the availability of sources of support, regardless of how dependable the support is. This allows for generation of multidimensional hypotheses related to affectionate support; for example, having one highly dependable source of affectionate support promotes safer behaviors, whereas having larger networks for affectionate support does not. Thus, both functional and structural measures added valuable information about how social support resources are related to behaviors and outcomes in our study population,

information that could potentially be utilized in shaping prevention discussions with teens.

For outcomes that depend heavily on the behaviors of others (such as STI acquisition), the number of people a woman depends on may not be as important as the type of people she depends on. We hypothesized that characteristics of a teen's network would be associated with reproductive health behaviors and outcomes. For some characteristics measured, this was true, and information collected about the network characteristics generated hypotheses about the role of acculturated versus non-acculturated individuals on a woman's risk and about the role of a sexual partner on her risk. Though beyond the scope of this thesis, the data collected from the network instrument also allows for analysis of source-specific social support (for example, we could determine whether identifying a partner as someone she depends on for *informational* support is associated with a woman's teen pregnancy history). Others have argued the importance of taking into account the source of social support when examining relationships with health outcomes [29, 30, 42, 64], as different sources may provide different types of support [64] which may then influence outcomes in different ways. Given the intriguing finding in this small study that identifying a partner as a close friend may be associated ($p < 0.1$) with less risky behavior and lower likelihood of abortion and STI positivity, it is possible that future studies conducted with larger sample sizes would benefit from examining the role of partner-specific, friend-specific, relative-specific, and US-born-specific structural support on reproductive health outcomes among young Latina immigrants.

Acculturation/migration characteristics and reproductive health risks

In a recent review of acculturation and reproductive health among Latino youth in the U.S., Afable-Munsuz and Brindis[65] found that while most studies among Latina youth demonstrated that sexual risk-taking was associated with greater acculturation, studies on fertility outcomes (teen pregnancy, abortion) were less conclusive. In a qualitative study of recently migrated (<5 years) Latino youth, we found that these youth had low access to reproductive health care and information about condoms[67], which suggested that the least acculturated immigrants may be particularly vulnerable to adverse reproductive health outcomes. For this reason, in this study, we explored the influence of certain acculturation (language of interview, length of time in US, age of migration) and migration characteristics (country of birth, migrating alone, frequency of returning to birth country) on reproductive health risks among young, foreign-born Latinas. Analyses of our study population supported findings reported by other, mixed U.S.- and foreign-born populations [17, 61, 66], suggesting that more acculturated Latinas are more likely to have had abortions than less acculturated Latinas. However we did not find significant relationships between acculturation measures and risky behaviors, STI prevalence, or history of teen pregnancy. This may be because of limitations of our sample size and relatively simple method of assessing acculturation. The unique risks faced by migrated youth are poorly understood, and warrant further investigation. Furthermore, priority should be given to “studies that explicitly investigate links between time measures of acculturation, changing beliefs and norms, and sexual and reproductive behaviors, particularly contraceptive use and fertility desires.”[65]

Study limitations

The small sample size in this study may have limited the ability to detect significant associations between predictors and outcomes. Recruitment of young Latina immigrants during the enrollment period may have been hindered by the political uncertainty for many in the Oakland community during our study period, as the national debate on immigration law intensified and police deportation raids in the community were common. Though we did not ask participants about immigration status, it is possible that this political climate may have discouraged some eligible women from participating as we asked other personal questions about migration experiences.

The clinic-based recruitment method may have biased the sample to those who access care (and therefore could be more health-conscious) or to those who need care (more likely to be pregnant or have STIs). Furthermore, the convenience method of sampling is not ideal, due to potential participation bias, as those who agreed to participate may be more acculturated, more comfortable discussing sexual issues, and more or less likely to be having sex than those who did not.

Relationships between social support measures and the STI outcome should be interpreted cautiously, as HSV-2 and Chlamydia outcomes were combined due to low counts. This is not ideal given that HSV-2 seroprevalence reflects exposure in the past to the STI, whereas Chlamydia infection reflects current/recent STI exposure. Additionally, our measures of acculturation (length of time in the U.S. and language of interview) are relatively crude and may not reflect acculturation as accurately as other measurements that take into account cultural beliefs and norms.[65]

Because this was a small, non-representative sample, findings are not generalizable to all Latina immigrants in the Bay Area. Also, because the study subjects

were primarily Mexican, findings are not generalizable to other Latinas, such as Puerto Ricans and Cubans, who have been shown to have different patterns of sexual risk-taking [3, 16]. Finally, the cross-sectional design of the study limited validity of inferences about potential causal directions between variables.

Conclusions

Young Latina immigrants make up a significant and growing proportion of the U.S. population. It is important to understand the factors that mediate risky behaviors and outcomes in this population in order to better target prevention messages and interventions. This is the first study to describe associations between social support and reproductive health risks among young Latina immigrants. Use of a multidimensional social support instrument demonstrated that functional support, structural support, and network characteristics were all predictive of sexual behaviors and outcomes, and highlighted the inverse relationships of higher social support with risky behaviors and reproductive health outcomes in this population.

Future studies involving larger sample sizes and longitudinal designs are needed to replicate these findings in order to develop appropriate prevention and intervention strategies. Additionally, findings from our study suggest a need for more in-depth analyses of: the role source-specific support (especially from sexual partners) plays in mediating reproductive health risks in this population; the roles of self-esteem, self-efficacy, and confidence in mediating social support's influence on reproductive health risk; and the potential interactions between social support, acculturation and risky behaviors and outcomes among Latina immigrants.

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TABLES

Table 1. Pearson item-scale and scale-scale correlations for MOS social support scale in 15-24 year old Latina immigrants.

Social Support item	Mean	S.D.	Sub-Scales						
			TAN	AFF	EMO ^a	INFO ^a	EMI	PSI-1 ^a	PSI-2
Availability of:									
Help if confined to bed	4	1.2	0.78	0.4	0.43	0.44	0.55	0.4	0.44
Take to doctor	4.1	1.1	0.65	0.23	0.39	0.42	0.53	0.3	0.4
Prepare meals	3.6	1.2	0.78	0.36	0.51	0.49	0.6	0.47	0.48
Help with daily chores	3.8	1.3	0.82	0.45	0.53	0.52	0.6	0.51	0.5
Show love and affection	4.4	0.9	0.4	0.8	0.6	0.52	0.68	0.5	0.58
Hug you	4.1	1.2	0.35	0.88	0.65	0.42	0.63	0.62	0.62
Make you feel wanted	4.4	0.9	0.3	0.79	0.43	0.3	0.49	0.42	0.46
Listen to you	4.2	0.9	0.49	0.58	0.78	0.59	0.78	0.4	0.69
Confide in	4.1	1.1	0.43	0.53	0.85	0.55	0.79	0.58	0.59
Share worries with	3.7	1.3	0.56	0.62	0.87	0.67	0.83	0.55	0.55
Understand your problems	3.8	1.1	0.61	0.58	0.87	0.75	0.88	0.6	0.58
Give you good advice	4.2	0.9	0.5	0.4	0.56	0.79	0.75	0.41	0.44
Give you information	3.6	1	0.57	0.37	0.51	0.81	0.74	0.49	0.54
Give advice you really want	3.9	1.1	0.47	0.35	0.65	0.88	0.83	0.48	0.48
Turn to for suggestions	3.6	1.2	0.5	0.49	0.74	0.81	0.84	0.58	0.57
Have a good time with	4	1	0.38	0.47	0.5	0.43	0.54	0.77	0.82
Get together for relaxation	3.6	1.2	0.51	0.59	0.64	0.42	0.66	0.86	0.85
Do something enjoyable	3.9	1.2	0.4	0.44	0.49	0.39	0.52	0.83	0.86
Get your mind off things	3.7	1.2	0.55	0.63	0.72	0.61	0.75	0.88	0.79
Sub-scales									
TAN	3.9	0.9	1						
AFF	4.2	0.9	0.48	1					
EMO ^a	4	0.9	0.62	0.68	1				
INFO ^a	3.8	0.9	0.62	0.49	0.76	1			
EMI	3.8	0.9	0.55	0.63	0.94	0.93	1		
PSI-1 ^a	3.8	1	0.52	0.64	0.71	0.6	0.7	1	
PSI-2	3.8	1	0.66	0.6	0.94	0.56	0.65	0.98	1

Note: TAN=tangible support; AFF=affectionate support; EMO=emotional support; INFO=informational support; EMI=emotional/informational support; PSI-1=positive social interaction, 4 items; PSI-2=positive social interaction, 3 items; **bolded** items indicate correlations>0.7

^aIndicates sub-scales that were not included in analyses due to high correlations with other subscales and variables

Table 2. Background Characteristics: Demographics and Migration Characteristics (n=68)

	N or range	Mean or %
Demographics		
Age, yrs (mean) [range]	[15-25]	18.7 (S.D. 2.2)
Married (%)	7	10.3
Graduated or currently attending high school (%)	43	63.2
Live in crowded housing (%) ^a	26	38.3
Household receiving government benefits (%)	41	60.3
Worked during past 6 months (%)	35	
Who lived with past 6 months (%)		
<i>Alone</i>	2	2.9
<i>Nuclear family</i>	45	66.2
<i>Boyfriend or husband</i>	28	41.2
<i>Extended family</i>	18	26.5
<i>Roomate/Friend</i>	8	12.8
<i>Other</i>	2	2.9
Religion=Catholic	58	85.3
Attends religious services >=1/week	10	14.7
Migration Characteristics		
Interview in Spanish (%)	42	61.8
Country of Birth (%)		
<i>Mexico</i>	52	76.5
<i>Other Central American Country</i>	10	14.7
<i>South American Country</i>	4	5.9
<i>Puerto Rico</i>	2	2.9
Age of migration, yrs (mean) [range]	[<1-21]	10.6 (S.D. 6.5)
Years living in U.S. (mean) [range]	[0-22]	7.8 (S.D. 6.5)
Has returned to home country (%)	22	32.4
Most important reason for migration (%) ^b		
<i>To join family/spouse/boyfriend in U.S.</i>	25	36.8
<i>Parent seeking job/more money</i>	14	20.6
<i>Participant seeking to further own education</i>	8	11.8
Who participant migrated with (%)		
<i>Alone</i>	11	16.2
<i>Parent</i>	35	51.5
<i>Other relative</i>	34	50
<i>Boyfriend or husband</i>	4	5.9
<i>Other</i>	8	12.8
Number of family members in U.S.		
<i>0</i>	6	8.8
<i>1-5</i>	10	14.7
<i>>5</i>	52	76.5

^a Crowded housing is defined as >=3 people per bedroom

^b Only the 3 most common reasons listed here. Others include: for a better life, participant seeking job/more money, family/marital conflict, safety, to support children, other.

Table 3. Reproductive Health Behaviors and Outcomes

	N or range	Mean or %
Ever had vaginal or anal sex (%)	65	95.6
Age at first intercourse, yrs (mean) [range] ^a	[13-20]	15.6 (S.D. 1.7)
Used contraception at first intercourse (%) ^a	36	55.4
Number of lifetime sex partners (mean) [range] ^a	[1-13]	2.8 (S.D. 2.2)
Had multiple partners in the past year (%) ^a	20	30.8
Used contraception during the past year (%) ^a		
<i>Condoms</i>	53	81.5
<i>Spermicides</i>	5	7.7
<i>Birth control pills</i>	14	21.5
<i>DepoProvera</i>	8	12.3
<i>Female condoms</i>	2	3.1
<i>Withdrawal</i>	34	52.3
<i>The patch</i>	12	18.5
<i>Other method</i>	6	9.4
Used contraception half the time or less during past year (%) ^a	34	52.3
Ever pregnant (%) ^a	45	69.2
Ever pregnant at age < 18 yrs (%) ^a	29	44.6
Ever had an abortion (%) ^a	8	12.3
Positive for trichomonas (%)	0	0
Positive for chlamydia (%)	3	4.4
Positive for herpes (%) ^b	5	8.3
Positive for at least 1 STI (%) ^b	8	13.3
^a % based on responses from the 65 participants who had ever had vaginal or anal sex ^b 8 participants were not tested for herpes, % based on n=60		

Table 4a. Associations between functional support scales, structural support and reproductive health risks.

Unadjusted odds ratios and odds ratios adjusted for crowded housing and language of interview.

Predictors	Used condom past year		Multiple partners past year		Teen pregnancy		Abortion		STI Positive	
	UNADJ	ADJ	UNADJ	ADJ	UNADJ	ADJ	UNADJ	ADJ	UNADJ	ADJ
Functional Support Scales										
Overall Social Support	1.6	N.C.	0.827	N.C.	0.772	N.C.	0.252 ^c	0.158 ^b	5.633 ^a	5.604 ^a
Tangible Support	1.738 ^a	2.308 ^b	1.034	N.C.	0.719	N.C.	0.156 ^c	0.074 ^b	2.342	N.C.
Emot/Info Support	1.358	N.C.	0.782	N.C.	0.756	N.C.	0.278 ^b	0.223 ^b	3.891 ^b	3.996 ^a
Affectionate Support	1.246	N.C.	0.591 ^b	0.614 ^a	0.998	N.C.	0.493 ^b	0.409 ^a	3.311	N.C.
Pos. Soc. Interaction	1.661	N.C.	1.199	N.C.	0.886	N.C.	0.595	N.C.	2.705 ^a	2.863 ^a
Structural Support										
# friends & relatives who provide:										
Tangible Support	1.409	N.C.	1.236	N.C.	0.534	N.C.	0.406	N.C.	1.029	N.C.
Emotional Support	1.189	N.C.	1.901	N.C.	0.458 ^a	0.499	0.567	N.C.	2.336	N.C.
Informational Support	1.131	N.C.	0.762	N.C.	0.290 ^b	0.252 ^c	0.539	N.C.	0.513	N.C.
Affectionate Support	5.254 ^c	4.586 ^b	1.521	N.C.	0.356 ^b	0.364 ^b	0.585	N.C.	4.515	N.C.
Pos. Soc. Interactions	3.924 ^b	4.0 ^b	1.882	N.C.	0.316 ^b	0.326 ^b	0.585	N.C.	0.969	N.C.
Number of close friends and relatives	1.023	N.C.	0.918	N.C.	1.014	N.C.	0.889	N.C.	0.97	N.C.

N.C.- not calculated ^a p<0.1; ^b p<0.05; ^c p<0.01

Functional Support was measured using the MOS Social Support Survey as an overall scale and as four sub-scales that assessed: tangible support, emotional and informational support, affectionate support, and positive social interactions

Structural Support was measured as both the total number of people identified as close friends and relatives, and by the number of people identified who could be counted on to: take you to the doctor, confide in, give you advice, show you love and affection, and have a good time with. See Appendix for exact wording of questions.

Table 4B. Associations between structural support measures and condom use and teen pregnancy: Chi Square Analyses

# of friends and relatives who provide:	Used condoms past year			Ever had a teen pregnancy		
	N	% ^a	p value	N	% ^a	p value
Tangible Support						
0 people	2	66.7	0.761	2	66.7	0.366
1 person	30	81.1		18	43.4	
>1 person	21	84		9	33.3	
Emotional Support						
0 people	3	75	0.931	4	100	0.049
1 person	26	81.25		14	42.4	
>1 person	24	82.76		11	35.48	
Informational Support						
0 people	3	75	0.941	4	100	0.014
1 person	27	81.8		17	48.6	
>1 person	23	82.1		8	27.6	
Affectionate Support						
0 people	1	50	0.009	2	100	0.071
1 person	14	63.6		12	54.6	
>1 person	38	92.7		15	34.1	
Pos. Social Interactions						
0 people	0	0	0.005	2	100	0.048
1 person	16	76.2		12	57.1	
>1 person	37	88.1		15	33.3	

^a Percentages were calculated using the total for each structural support variable category as the denominator (e.g. the total number of people who reported having 0 people they could count on for tangible support).

Table 5. Associations between characteristics of participants' "close friends and relatives" networks and reproductive health risks.

Unadjusted odds ratios and odds ratios adjusted for crowded housing and language of interview.

Characteristics of people identified as close friends and relatives:	Used condom past year		Multiple Partners Past Year		Teen Pregnancy		Abortion		STI Positive	
	UNADJ	ADJ	UNADJ J	ADJ	UNADJ	ADJ	UNADJ	ADJ	UNADJ	ADJ
>=1 boyfriend/sex partner	1.39	1.92	0.37 ^a	0.39 ^a	2.25	2.08	0.23 ^a	0.191 ^a	0.27 ^a	0.21 ^a
>15% Male	1.03	1.13	0.24 ^b	0.23 ^b	1.08	1.03	0.83	0.945	0.81	0.74
>=1 U.S.-born person	1.69	2.47	0.78	0.61	0.51	0.69	3.53	1.219	0.11 ^b	0.08 ^a
% Friends (v. Relatives)	1.03 ^a	1.03 ^a	1.01	1.01	0.98	0.98	1.05 ^b	1.052 ^a	0.99	0.99

N.C.- not calculated

^a p<0.1; ^b p<0.05

% Friends = the % of people in the total network identified as friends, as opposed to relatives. Here it is the only variable assessed as a continuous variable, as it was the only variable with a normal distribution.

Table 6. Unadjusted odds ratios: Associations between participants' acculturation and migration characteristics and reproductive health risks.

	Used condom past year	Multiple partners past year	Teen pregnancy	Abortion	STI Positive
Acculturation:					
Language preference English	0.78	1.11	0.44	9.33 ^b	0.45
Number of years in the U.S.	0.99	1.01	1	1.17 ^b	1
Age of migration	1.02	0.98	0.98	0.88 ^a	0.99
Migration:					
Birth country=Mexico (vs. other)	0.23	0.89	0.94	0.89	2.84
Ever returned to birth country	1.06	0.62	2.67 ^a	0.96	0.81
Migrated alone (vs. with others)	1.02	0.88	0.45	2.13	0.6

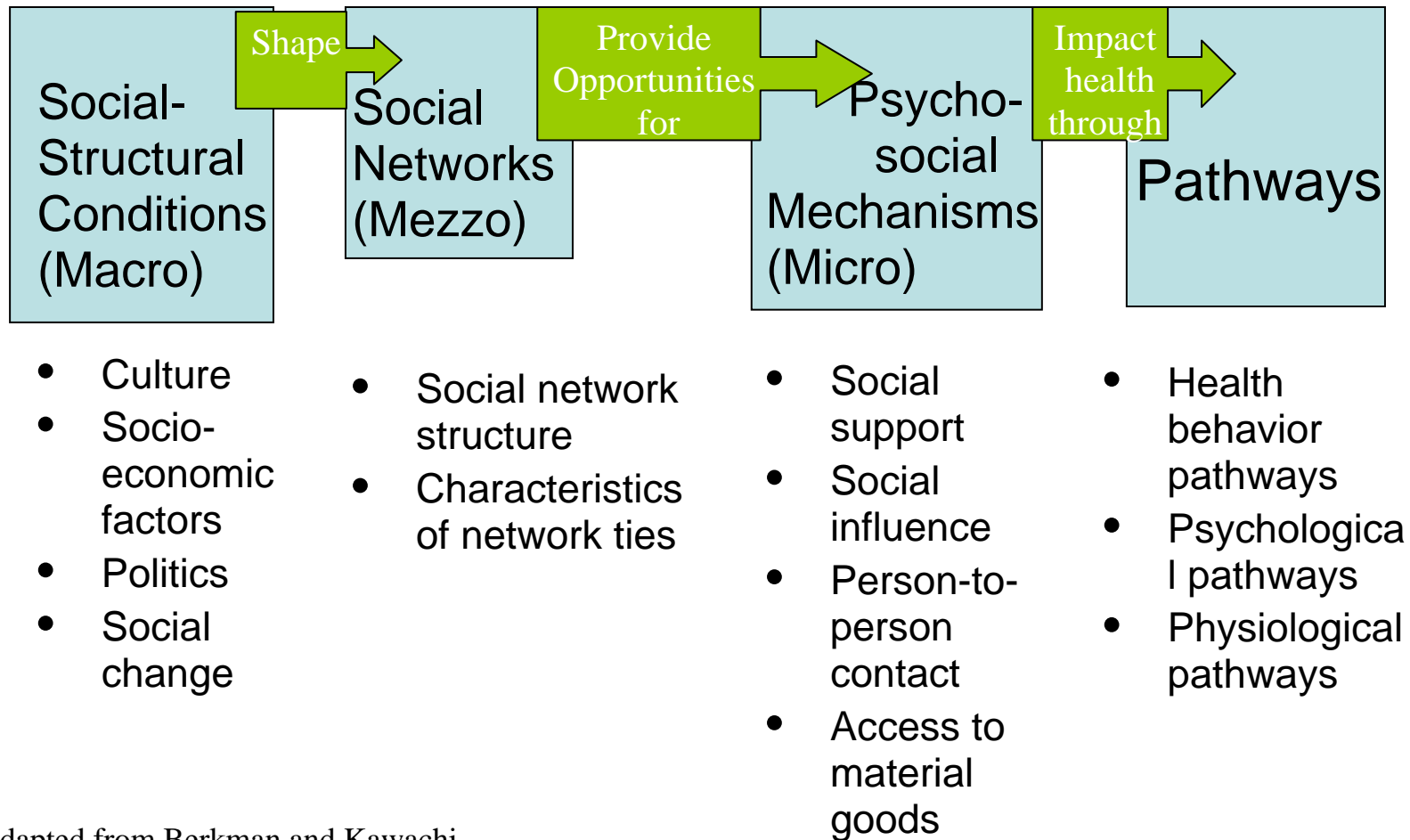
^a p<0.1; ^b p<0.05

FIGURES

Figure 1. Theoretical model.

FIGURE 1

Theoretical Model



Adapted from Berkman and Kawachi
figure 7-1, *Social Epidemiology*, 2000

APPENDIX

Appendix 1. Social Support Questionnaire.

READ: The next questions are about the friends and relatives who are close to you. By close to you I mean the people you spend your free time with more than others, or who you trust and depend on more than others. This can include friends, family members, and husbands/boyfriends.

3.00a Think of all your close friends and relatives. How many close friends and relatives do you have?

___ ___ [# of close friends and relatives]

___-8 Don't know

___-7 Declined

GO TO CLOSE FRIENDS AND RELATIVES CHART. READ INSTRUCTIONS AND FILL OUT, THEN RETURN TO FOLLOWING QUESTIONS:

READ: Next are some questions about the support that is available to you. People sometimes look to others for companionship, assistance, or other types of support. I am going to ask you about different situations where you might need support, and will ask you to respond to each one. Some of these situations may or may not apply to you, so just give your best answer.

(How often do you have someone...)	None of the time	A little of the time	Some of the time	Most of the time	All of the time	DEC LINE	Don't know
3.1 to help you if you were confined to bed?	___1	___2	___3	___4	___5	___-7	___-8
3.2 who would listen to you when you need to talk?	___1	___2	___3	___4	___5	___-7	___-8
3.3 to give you good advice about a crisis?	___1	___2	___3	___4	___5	___-7	___-8
3.4 to take you to the doctor if you needed it?	___1	___2	___3	___4	___5	___-7	___-8
3.5 who shows you love and affection?	___1	___2	___3	___4	___5	___-7	___-8
3.6 to have a good time with?	___1	___2	___3	___4	___5	___-7	___-8
3.7 to give you information to help you understand a question?	___1	___2	___3	___4	___5	___-7	___-8
3.8 to confide in or talk to about yourself or your problems	___1	___2	___3	___4	___5	___-7	___-8
3.9 who hugs you?	___1	___2	___3	___4	___5	___-7	___-8
3.10 to get together with for relaxation?	___1	___2	___3	___4	___5	___-7	___-8
3.11 to prepare your meals for you if you were unable to do it yourself?	___1	___2	___3	___4	___5	___-7	___-8
3.12 whose advice you really	___1	___2	___3	___4	___5	___-7	___-8

want?							
3.13 to do things with to help you get your mind off things?	___1	___2	___3	___4	___5	___-7	___-8
3.14 to help with daily chores if you were sick?	___1	___2	___3	___4	___5	___-7	___-8
3.15 to share your most private worries and fears with?	___1	___2	___3	___4	___5	___-7	___-8
3.16 to turn to for suggestions about how to deal with a personal problem?	___1	___2	___3	___4	___5	___-7	___-8
3.17 to do something enjoyable with?	___1	___2	___3	___4	___5	___-7	___-8
3.18 who understands your problems?	___1	___2	___3	___4	___5	___-7	___-8
3.19 to love and make you feel wanted?	___1	___2	___3	___4	___5	___-7	___-8

Of the people listed in your chart, who can you count on in the following situations? (List ROW# AND initials of ALL those that apply)

Who can you count on to...

3.20 Have a good time with:

3.21 Give you advice you really want:

3.22 Take you to the doctor if you needed it:

3.23 Show you love and affection:

3.24 Confide in or talk to about yourself or your problems: