Preventive Medicine Reports 19 (2020) 101105

Contents lists available at ScienceDirect

Preventive Medicine Reports

journal homepage: www.elsevier.com/locate/pmedr

Culture and sexuality-related communication as sociocultural precursors of HPV vaccination among mother-daughter dyads of Mexican descent

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ARTICLE INFO

Keywords:
HPV Vaccination
Latina mother-daughters
Sociocultural factors
Sexuality-related communication

ABSTRACT

U.S. Latinas are the second most affected ethnic group by cervical cancer morbidity and mortality. Cervical cancer is caused by high risk Human Papillomavirus (HPV) strains and HPV vaccines are an effective form of primary prevention. Parents are the primary decision makers of vaccination uptake as vaccination is recommended for children between the ages of 11–12. The purpose of our study is to investigate the influence of sociocultural factors particularly salient to U.S. Latinos and their role in facilitating or hindering communication about sexuality and vaccination uptake. We conducted a mixed methods sequential study with Latina mother-daughter dyads of Mexican descent (50% who had vaccinated). Our study was informed by the Information-Motivation-Behavioral Skills (IMB) model of preventive behavior. We assessed the influence of communication about sexuality on uptake and the influence of relationship factors such as familism, mother-daughter connectedness, and children's autonomy and cultural factors such as acculturation and ethnic identity on sexuality-related communication. Our results indicated that mothers who engaged in conversations about birth control methods with their daughters had 5.69 times the odds of having vaccinated their daughters. Our qualitative data indicated that mothers who had vaccinated communicated about sexuality emphasizing that sexuality is a normal part of life, perceived that their child is likely to be sexually active one day, and viewed themselves as a primary source of sexuality-related information compared to mothers who had not vaccinated. Findings highlighted potential sociocultural approaches to motivate open communication about sexuality and adoption of sexual health preventative measures for children.

1. Culture and sexuality-related communication as sociocultural precursors of HPV vaccination among mother-daughter dyads of Mexican descent

U.S. Latinas suffer from higher rates of reproductive cancers than non-Latina White women. The rate of cervical cancer for Latinas is 9.8 per 100,000 population compared to 7.5 in non-Latina White women (ACS, 2015). The Human Papillomavirus (HPV) is a sexually transmitted infection and high-risk strains are the primary precursors of cervical cancer (Baseman and Koutsky, 2005). The HPV vaccine is a primary form of prevention and consists of a series of 2–3 doses applied six months apart. Vaccination is recommended for 9–12-year-old children to maximize immunological protection, which makes parents the primary decision makers. Vaccination ≥2 doses in Latina eligible girls between the ages of 13 and 17 are estimated to be 57.8% and 3 doses 40.8% (Reagan-Steiner et al., 2016), which is lower than the 70% estimated coverage needed to achieve protection at the population level (Kim and Goldie, 2008).

Past research has elucidated the factors that influence HPV vaccination uptake in U.S. Latina mothers as they play a central role in vaccination decisions (Painter et al., 2019). In addition, most of the U.S. research on Latina HPV vaccination uptake has been conducted with mothers of Mexican descent as 64% of U.S. Latinos are of Mexican origin (Lopez, 2015). Such research indicates that perceived benefits of vaccination and a provider's recommendation is associated with vaccination acceptance and safety concerns, low perceived risk of HPV, and sexuality-related concerns emerge as vaccination barriers (Galbraith et al., 2016). A recent study by Rodriguez et al. (2018) employing a longitudinal design indicated that concern that vaccination may lead to initiation of sexual relations was the only variable of the variables examined in the study that decreased the odds of vaccination among Latina mothers.

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https://doi.org/10.1016/j.pmedr.2020.101105
Received 14 October 2019; Received in revised form 14 April 2020; Accepted 23 April 2020
Available online 04 May 2020

Sexuality-related concerns in Latina mothers may be underpinned by endorsement of sociocultural normative beliefs that promote sexual silence. Sociocultural normative beliefs are beliefs that are influenced by institutional and familial socialization practices that transmit values, norms, and behavioral expectations through generations. Sexual silence refers to the finding that Latino parents engage in fewer conversations about sexuality with their children (Hovell et al., 1994; O'Sullivan et al., 2001) and feel greater discomfort than non-Latino White parents (Hutchinson, 2002; Meneses et al., 2005; Raffaelli and Green, 2003). Discomfort is associated with fewer discussions about the importance of adopting sexuality-related preventive behaviors such as condom use and contraception (Romo et al., 2010).

Prior research has shown that parental communication about sexuality and vaccination do influence HPV vaccination in college age women. For example, a study by Hopfer et al. (2017) examined HPV vaccination narratives among Vietnamese and Latina college age women and findings indicated that silence about sexual health emerged as a powerful vaccination barrier. In addition, Krieger et al. (2011) indicated that mother-daughter communication about the HPV vaccine had an influence on college age women's HPV vaccination uptake. Research conducted with Latina college age women specifically, indicates that mother-daughter communication about sexuality is associated with vaccination uptake (Roberts et al., 2010).

Studying whether sociocultural factors salient to U.S. Latinos facilitate or hinder parental communication about sexuality and vaccination and vaccination uptake may inform the development of culturally grounded interventions. Salient sociocultural factors for Latinos include relationship factors such as familism, mother-daughter connectedness, and daughters' autonomy. Familism is an important Latino cultural value and refers to: 1) strong feelings of allegiance and attachment to the immediate and extended family, 2) seeing family as role models, 3) expectations that the individual will sacrifice for the benefit of the group, 4) avoidance of behaviors that will bring dishonor to the family, and 5) expectations of reciprocity and support when the need arises (Rodriguez et al., 2007). Past research suggests that familism plays a central role in the adoption of several preventative health behaviors (Perez and Cruess, 2011). Research suggests that mother-daughter connectedness influences the adoption of sex-related preventive measures such as contraception (Commendador, 2010). However, the extent to which familism and mother-daughter connectedness influences communication about sexuality and vaccination decisions among Latina mothers, who are members of a culture that emphasizes interdependence and relatedness, has not been explored. Lastly, the influence of developmental factors such as children's autonomy, defined as perceived individuation and non-dependency on parents (Zimer-Gembeck et al., 2008), on conversations about sexuality and HPV vaccination has not been considered in past research.

Other relevant sociocultural factors for Latinos include acculturation and ethnic identity. Acculturation refers to how strongly an individual affiliates with a receiving culture and ethnic identity refers to the extent to which individuals identify with their ethnic heritage (Zea et al., 2003). Prior studies testing the influence of acculturation on vaccination uptake have yielded mixed findings. Language preference had no association with vaccination uptake but use of a more comprehensive measure of acculturation yielded a positive association between acculturation and vaccination uptake (Gerend et al., 2013). We contend that a potentially fruitful approach to study the influence of acculturation and ethnic identity on uptake may be to consider how such factors influence other culture driven factors such as engagement in sexuality-related discussions and endorsement of Latino values such as familism.

Our study was informed by the Information-Motivation-Behavioral Skills (IMB) model of preventive behavior (Fisher et al., 2009). We focused on the motivation domain and expanded it by incorporating the individualism-collectivism cultural theory of socialization (Markus and Kitayama, 1994; Riemer et al., 2014) which indicates that sociocultural normative beliefs may be more salient in the decision-making process of individuals socialized in a culture that emphasizes the interdependence of the self with the in-group. Thus, our interview guide and survey assessed the role of sociocultural factors in motivating sexuality-related conversations and vaccination.

2. Methods

2.1. Recruitment and procedures

We employed a mixed-methods design to seek corroboration and expansion of findings from different methods designed to study the same phenomenon. We followed a fully mixed parallel quantitative dominant approach (Tashakkori and Teddlie, 2010). Such an approach is innovative because past HPV vaccination research has over-relied on quantitative research informed by traditional health behavior change theories (i.e., the health belief model) leading researchers to focus on studying the influence of personally derived attitudes towards vaccination at the expense of sociocultural influences (Galbraith et al., 2016).

We conducted a survey and semi-structured interview with 34 mother-unvaccinated daughter dyads and 31 mother-vaccinated daughter dyads. Community health workers approached potential participants in public places (e.g., churches, schools, supermarkets), provided a brief description of the study, and asked interested individuals to answer a brief screening questionnaire to verify eligibility. Eligibility criteria was being a Latina of Mexican descent and the mother or the legal guardian of a daughter between the ages of 9 and 15. All interviews were conducted in mothers' private residences. Mothers and daughters were interviewed separately. The survey lasted between 20 and 35 min and the survey questions were read to participants. Mothers and daughters also answered a semi-structured interview that lasted between 40 and 60 min.

Two English/Spanish bilingual researchers administered the survey and conducted the interviews. All mothers chose to answer the survey and in-depth interview in Spanish and approximately 90% of daughters chose to answer in English. Survey assessment instruments not available in Spanish were translated from English into Spanish following the translation-back translation approach (Brislin, 1970). A focus group was conducted with members of the community to verify translation accuracy and identify and correct problematic items. Mothers and daughters were each compensated $40.00 for their participation. The University of Texas at El Paso granted IRB approval.

2.2. Quantitative measures and interview guide

Surveys with mothers inquired about marital and medical insurance status, employment, monthly income, history of STI, HPV, and cervical cancer diagnosis. Questions about history of STI, HPV and cervical cancer diagnoses assessed whether participants had ever received such a diagnosis (0 = 'No' and 1 = 'Yes'). Vaccination uptake was assessed by asking mothers whether their daughter had received the HPV vaccine (0 = 'No' and 1 = 'Yes') and if so, number of doses received, date, and place where the vaccine was administered. Surveys with daughters inquired about age, ethnicity, and grade in school. In addition, mothers and daughters answered the following measures separately.

2.2.1. Conversations about sexuality

Frequency of conversations was assessed by first asking whether they engaged in sexuality-related discussions (0 = 'No', 1 = 'Yes'). If yes, how often? (1 = 'once per year', 2 = 'once per month', 3 = 'once per week', 4 = 'daily'); conversations about the following topics: what it is to have sex, when it is appropriate to have sex, how to prevent a pregnancy, STIs, and birth control (0 = 'No', 1 = 'Yes'); and own level of comfort having conversations (1 = 'Not comfortable at all' to 7 = 'Very comfortable'). We assessed endorsement of beliefs that may

hinder sexuality-related discussions with four items. A sample item is "my [daughter is/mother thinks I am] immature to have conversations about sexuality with [her/me]" (1 = 'Completely disagree' to 7 = 'Completely agree').

2.2.2. Relationship factors

The 18-item Attitudinal Familism Scale (Lugo Steidel and Contreras, 2003) was used to assess mothers' attitudes regarding the place of the family in the life of the individual, family interconnectedness, support, and the importance of preserving family honor (1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.84). The 11-item scale developed by Colon (1998) was used to assess daughter's perceptions of family interconnectedness (1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.91). The 14-item scale developed by Aronowitz and Morrison-Beedy (2004) was used to assess mother-daughter connectedness including the extent to which mothers and daughters perceive that they communicate well, trust each other, and care/are cared for (1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.87 for mothers and 0.93 for daughters). The 20-item scale developed by Steinberg and Silverberg (1986) was used to assess daughter's feelings of being independent beings separate from their parents (e.g., 1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.79).

2.2.3. Acculturation and mothers' ethnic identity

Mothers' acculturation and ethnic identity was assessed with the 42-item Abbreviated Multidimensional Acculturation Scale developed by Zea et al. (2003), which assesses ethnic identity, language use, and cultural knowledge for U.S. and Latino culture (1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.97 for Latino ethnic identity and 0.98 for acculturation to U.S. culture). Daughters' acculturation was measured with the 12-item child acculturation scale developed by Bauman (2005) assessing acculturation as English language proficiency (1 = 'Completely disagree' to 7 = 'Completely agree'; α = 0.76).

The in-depth interview questions were informed by the IMB theory and inquired about motivators of vaccination and vaccination decision making in the context of the value of familism and mother-daughter connectedness. Mothers and daughters were also asked about the issues that impinge and facilitate conversations about sexuality-related topics and vaccination with one another and the factors that would facilitate vaccination.

2.3. Data analysis

Quantitative data analysis was conducted with the Statistical Package for the Social Sciences (SPSS) version 25.0 and consisted of descriptive statistics to characterize the sample, chi-square tests to assess differences in proportions in conversations about sexuality across dyads, and bivariate correlations. In addition, two separate blocked logistic regression equations, one for mothers and one for daughters, were computed. Vaccination uptake was regressed on engagement in sexuality-related conversations, frequency, and discussions about appropriate timing of sexual debut, birth control and pregnancy prevention. For both regression equations, daughter's age, and in the case of mothers, monthly income were entered in the first block of the regression equations using the enter procedure to control for these variables due to differences observed between vaccinated and unvaccinated dyads. The rest of the variables were entered using the stepwise procedure to identify the variables that would predict the greatest proportion of variance in vaccination uptake.

Qualitative analysis consisted of thematic analysis of audiotape transcriptions verified for accuracy. MaxQDA qualitative analysis software version 11.0 was used to manage and code the data. We employed thematic analysis as our goal was to identify patterns within the data (Braun and Clarke, 2006). The first author developed a preliminary list of codes. The first author and a second bilingual researcher proceeded to read through the data in the original language line by line independently and then proceeded to identify primary coding categories as well as the range of topics present within each category (Creswell et al., 2007). The coders met to compare their initial code assignments and as a result of discussions codes were changed, expanded, or collapsed. Final coding categories and topics were organized into a formal code book, and illustrative quotes relevant to these themes where extracted. A constant comparison approach across mothers and dyads by vaccination status was employed. All transcripts were rated by two coders. Inter-rater discrepancies were discussed until consensus was obtained.

Table 1
Demographic characteristics of mothers (N = 65).

	Mothers who had Vaccinated		Mothers who had not Vaccinated	
	N	%	*N*	%
Marital Status				
Married	18	58	17	50
Living together	8	25.8	9	26.5
Separated	2	6.5	6	17.6
Divorced	1	3.2	–	–
Other	2	6.5	2	5.9
Insurance				
No insurance	23	74.2	24	70.6
Medicaid	–	–	1	2.9
Private	4	12.9	4	11.8
Employment				
Unemployed	19	61.3	14	41.2
Part-time	10	32.3	9	26.5
Full-time	2	6.5	11	32.4
Monthly income				
$0–$999	19	61.3	25	78.1
$1000–$1599	11	35.5	7	21.9
$1600–$2000 or more	1	3.2	–	–
Diagnosis HPV				
No	18	58.1	28	82.4
Yes	–	–	2	5.9
Diagnosis STI				
No	19	61.3	30	88.2
Yes	1	3.2	2	5.9
Diagnosis Cancer				
No	16	51.6	26	76.5
Yes	2	6.5	5	14.7

3. Results

Mothers who had vaccinated had a mean age of 38.74 years (*SD* = 8.61) and a mean of 10.90 years of education (*SD* = 3.78). Mothers who had not vaccinated had a mean age of 36.85 years (*SD* = 6.92) and a mean of 10.15 years of education (*SD* = 4.17). Vaccinated and unvaccinated daughters' mean ages were 12.97 (*SD* = 1.63) and 11.34 (*SD* = 1.97), respectively. Other demographic characteristics are presented in Table 1.

Chi-square tests indicated that a greater proportion of mothers who had vaccinated (87.1%) had conversations about sexuality with their daughters vs mothers who had not (35.3%), $\chi = 4.38$, $p < .05$. Regarding specific topics, a greater proportion of mothers who had vaccinated (67.9%) discussed appropriate timing of sexual debut than mothers who had not (38.2%), $\chi = 5.39$, $p < .05$; pregnancy prevention (57.1%) vs (26.5%), $\chi = 6.00$, $p < .05$; and birth control methods (57.1%) vs (20.6%), $\chi = 8.79$, $p < .05$.

Results for the last step of the blocked logistic regressions are presented in Table 2. As Table 2 indicates, mothers who had discussed birth control methods had 5.69 times the odds of having vaccinated their daughters (Nagelkerke $R^2 = 0.37$). Daughters who discussed pregnancy prevention with mothers had 11 times the odds of having been vaccinated (Nagelkerke $R^2 = 0.38$). Bivariate correlations were computed between conversations about birth control (mothers) and pregnancy prevention (daughters) and endorsement of beliefs that

Table 2
Factors associated with vaccination uptake.

Variable	*B*	SE	*OR*	95% CI	Wald statistic	*p*
Mothers						
Daughter's Age	0.47	21	1.60	1.06, 2.42	5.12	.02
Monthly Income	0.39	0.24	1.48	0.92, 2.37	2.70	.10
Talk Birth Control	1.74	0.83	5.69	1.11, 29.24	4.34	.03
Daughters						
Daughter's Age	−0.29	0.32	0.74	0.39, 1.41	0.80	−.36
Talk Pregnancy Prevention	2.43	1.18	11.44	1.12, 116.28	4.24	−.03
Frequency of Conversations	1.22	0.64	3.41	0.96, 12.07	3.61	.05

Note. Data is for mothers (N = 65) and daughters (N = 65). Talk birth control = extent to which mothers reported having discussed birth control methods with daughters. Talk pregnancy prevention = extent to which daughters reported having discussed how to prevent a pregnancy with mothers. Frequency of conversations = frequency with which daughters report having engaged in conversations about sexuality with mothers. Mother's equation Nagelkerke R^2 = 0.374. Daughter's equation Nagelkerke R^2 = 0.38.

hinder engagement in sexuality-related conversations, comfort and frequency, and other sociocultural variables assessed. Table 3 presents bivariate associations.

As Table 3 indicates, for mothers, having a conversation about birth control was negatively associated with endorsing beliefs that hinder sexuality-related conversations and positively with comfort. Greater endorsement of beliefs that hinder conversations was associated with greater familism and Mexican identity. Frequency of having conversations was positively related to acculturation. Acculturation and Mexican identity were negatively related. Mother-daughter connectedness was positively associated with familism and Mexican identity.

For daughters, talking with mothers about pregnancy prevention was negatively related to perceived mothers' endorsement of beliefs that hinder conversations, and positively related to comfort, frequency, and mother-daughter connectedness. Comfort and frequency were positively related. Mother-daughter connectedness was positively related to autonomy and familism. Familism was positively related to autonomy.

Qualitative analyses indicated that mothers of vaccinated daughters approached the topic of sexuality qualitatively different than mothers who had not. In the following paragraphs, emergent themes and exemplary quotes will be presented to highlight qualitative differences between vaccinated and unvaccinated mothers and dyads.

3.1. Normalization of sexuality

Mothers of vaccinated dyads tended to perceive sexuality as a normal part of life. The following quote illustrates how perceiving sexuality as a normal part of development prompts this mother to converse with her daughter despite her resistance motivated by the realization that her daughter will be sexually active one day.

> "I talk to my daughter about sexuality, relationships, condoms and preventing a pregnancy very often. The most recent discussion was about how to prevent a pregnancy. My daughter started to tell me that she does not want to have sex. I told her she will change developmentally and she will experience urges to experiment." (*mother of vaccinated daughter, age 43*)
> "I feel very comfortable talking with my mother about sexuality and I ask her a lot of questions. She has talked to me about the importance of waiting to have a boyfriend until I finish my studies. She has told me about the changes in my body as I grow up including my period and that the best way to prevent getting pregnant is to use a condom." (*vaccinated daughter, age 13*)

This daughter's quote exemplifies her comfort and how it prompts her to ask more questions and suggests that her mother discusses a variety of topics including appropriate timing for dating and broaches the topic of dating in the context of important life goals such as studying.

3.2. Sexuality as a taboo topic

In contrast, mothers of unvaccinated daughters conveyed reluctance to communicate about sexuality and endorsement of taboos and perceiving that they did not have the appropriate information to provide seemed to hinder communication and vaccination uptake. A mother of an unvaccinated daughter said the following:

> "I have not talked with my daughter about sexuality. I feel that I don't have the correct information to provide and I fear that by initiating a conversation I may be putting things in her head, things that she may not yet be even thinking about. If I vaccinate her I would like to let her know that I am not sending her the message

Table 3
Bivariate correlations among variables.

	2	3	4	5	6	7	8
Mothers							
1. Talk Birth Control	−0.35*	0.39*	0.18	0.19	0.03	−0.07	0.11
2. Beliefs that Hinder Conversations		−0.19	−0.23	−0.10	0.30*	0.28*	−0.16
3. Comfort having Conversations			0.26	0.12	−0.13	−0.10	0.19
4. Frequency of Conversations				0.09	0.00	−0.11	0.39*
5. Mother-daughter Connectedness					0.35*	0.13	0.16
6. Familism						0.26*	−0.22
7. Mexican Identity							−0.45*
8. Acculturation							
Daughters							
	2	3	4	5	6	7	8
1. Talk Pregnancy Prevention	−0.27*	0.46*	0.50*	0.28*	0.21	−0.01	0.16
2. Beliefs that Hinder Conversations		−0.17	−0.21	0.04	−0.04	−0.18	0.12
3. Comfort Having Conversations			0.62*	−0.05	−0.10	−0.17	−0.07
4. Frequency of Conversations				0.16	0.04	0.17	−0.12
5. Mother-Daughter Connectedness					0.79*	0.58*	0.22
6. Familism						0.64*	0.05
7. Autonomy							−0.14
8. Acculturation							

Note. *correlations significant at p < .05.
Note. Some percentages may not add to 100 due to missing data.

that it is ok to have sex." (*mother of unvaccinated daughter, age 40*)
"My mom does not talk with me about sex. I think it is because we both feel uncomfortable and we don't communicate often or trust each other." (*unvaccinated daughter, age 14*)

This daughter's quote illustrates her perception that lack of trust and frequency of conversations hinders comfort.

3.3. Lack of connectedness and communication skills

Lack of trust and connectedness was a common feature among mother-unvaccinated daughter dyads. The following quote illustrates how life circumstances such as working all day have interfered with establishing a strong connection with daughter and has led to reduced frequency of discussions.

"I don't have a good communication with my daughter, I think this is because I work all day and I get home late and very tired. I would like to talk to her about sexuality more but I definitely think that she should not be having sexual relations now because she is too young." (*mother of unvaccinated daughter, age 34*)
"I don't like to talk with my mother about sexuality. I feel very uncomfortable because she wants to talk about it at very awkward times like when I go to the park with my friends and get back, she wants to talk about sexuality. I feel annoyed because I just went to the park. I have learned what I know at school. You know parents don't want you to grow up but you are doing stuff behind their backs" (*unvaccinated daughter, age 14*)

This daughter's quote exemplifies how discussing sexuality infrequently and only at times when her mother senses she may be dating promotes discomfort. This daughter also perceives her mother's yearning for her not to grow up.

3.4. Daughter characteristics as heuristics

Mothers of unvaccinated daughters often relied on daughter's characteristics such as age to determine daughter's readiness to date and engage in a conversation about sexuality with them. The following quote illustrates this mother's reasoning for waiting to have more in-depth conversations about sexuality:

"We have not really gotten deeper into the topic because I consider my kids to be children. My daughter is very young at the moment and she is just a child. I think that when she is closer to dating I will need to have these conversations with her including when is it appropriate to get pregnant and have children." (*mother of unvaccinated daughter, age 40*)
"My mom has not talked to me about sexuality, what I know I have learned at school" (*unvaccinated daughter, age 12*)

The daughter's quote confirms her mother's reticence to speak with her about sexuality as her primary source of information about sexuality is school.

3.5. Mother as a primary source of information

The belief that mothers are a primary trusted source of information was common among mothers of vaccinated daughters. The following quote illustrates one mother's belief that she is responsible for providing information and feeling that the future of her daughter depends on it. These beliefs seemed to motivate her to converse with her daughter about sexuality and vaccinate her despite her awareness of social norms prescribing against it.

"I believe that any kind of education and information begins at home. I have heard that speaking about sexuality with children or encouraging them to adopt sexual health preventative behaviors is to encourage them to engage in sexual activity. I disagree with this way of thinking. I talk with my daughter very often and I explain anything she wants to know. I am not ashamed to talk to her about sexuality because if I don't talk with her, she will walk through life in the dark." (*mother of vaccinated daughter, age 30*)
"My mom talks with me about sexuality and I sometimes get nervous and uncomfortable but the more she talks to me about it the less nervous I feel." (*vaccinated daughter, age 12*).

This daughter's quote highlights the importance of frequency of conversations in promoting daughter's comfort.

3.6. Daughter's autonomy and trust

The perception that daughter is an autonomous agent separate from parents was common among mothers of vaccinated daughters. The following exemplary quote suggests that perceiving daughter as an autonomous person, who will not necessarily tell her when she initiates sexual relations, motivated her to have conversations about sexuality and to vaccinate her:

"I have a very open communication with my daughter. However, I know that the day she decides to have sex, she will not tell me. That is why I decided to vaccinate her. I do tell her that even though a sexual relationship happens without much planning that she and her partner need to be prepared to prevent an STI" (*mother of vaccinated daughter, age 33*)
"My mother is very open and talks to me about sexuality and I don't feel awkward when she does. My mother is hungry to learn and always finds the most up to date information." (*vaccinated daughter, age 15*)

This daughter's quote conveys how her trust in her mother as the best source of information reduces her potential discomfort.

4. Discussion

The purpose of this study was to investigate the influence of sociocultural factors on Latina mothers' communication about sexuality and adoption of a sexual health preventative behavior for their daughters. Few HPV vaccination acceptance research has focused on combining methods to elucidate the role of sociocultural factors as most research has employed quantitative methods to elucidate personally derived attitudes towards vaccination. Our quantitative findings indicate that 87% of mothers who had vaccinated reported engaging in sexuality-related conversations about a variety of sexuality-related topics including appropriate timing of sexual debut, pregnancy prevention and birth control compared to 35% of mothers who had not vaccinated. Importantly, mothers who had engaged in conversations about birth control with daughter had 5 times the odds of having vaccinated them. Our quantitative findings indicated that talking about birth control and pregnancy prevention was positively related to comfort having sexuality-related conversations.

Our dyadic mixed method approach provided convergence of findings while also helping explicate quantitative findings. By comparing vaccinated and unvaccinated dyads, our qualitative findings pointed to factors that promote and hinder sexuality-related conversations among dyads assisting in our understanding of the qualitatively different ways in which vaccinated and unvaccinated dyads engage in sexuality-related communication and possible factors that promote comfort engaging in such conversations.

When compared to unvaccinated dyads, vaccinated dyads' conversations about sexuality seems to be facilitated by the perception that sexuality is a normal part of life. This perception seemed to underlie vaccinated mothers' engagement in frequent conversations about a variety of sexuality-related topics in the context of life events. Vaccinated daughters indicated that conversations about sexuality with mothers occurred in the context of life goals which seemed to promote

their comfort asking questions. Furthermore, a motivating factor for engaging in open communication about sexuality among vaccinated mothers is the perception that daughter is an autonomous agent likely to be sexually active one day and that parents may be unaware when sexual debut occurs. This demeanor seemed to promote daughter's comfort and perception that mother is the best source of information even if she needs to search for the correct information.

Quantitative findings indicated that conversations are inhibited by mothers' beliefs that daughter may not be mature enough to have conversations about sexuality, and that she does not have the correct information to convey to daughter. Qualitative findings corroborated this finding and assisted us in providing depth of understanding as to how these beliefs may contribute to discomfort and mistrust among the dyad further inhibiting sexuality-related communication.

For example, a factor inhibiting sexuality-related conversations among mothers of unvaccinated daughters seemed to stem from mothers' endorsement of taboos including fearing that sexuality-related conversations may "put things in her head…things she may not be even thinking about", as one mother said. This fear seems to underlie lack of conversations, feelings of not having the correct information and perceptions that vaccination could encourage daughter's perception that mother is condoning sex. In this case, daughter attributed lack of communication to discomfort and mistrust. Furthermore, mothers of unvaccinated dyads conveyed relying on heuristics, such as daughter's age, to judge daughter's readiness for conversations about sexuality. In this dyad, daughter perceived that her primary source for sexuality-related information is school which may further inhibit her willingness to communicate with mother.

Moreover, lack of connectedness among the dyad and mother's attempt at communicating with daughter about sexuality at times daughter considers it inappropriate promotes discomfort and mistrust. Conversely, the belief that it is mother's responsibility to provide daughters with information motivates sexuality-related discussions by counteracting feelings of discomfort or embarrassment. Vaccinated daughters reaffirmed feelings of comfort as a function of frequency of conversations and trust in mother and the information she provides. Quantitative findings support these qualitative findings as daughter's perception of mother-daughter connectedness and trust is positively related to engaging in conversations about pregnancy prevention.

An important aim of our study was to understand the influence of other sociocultural variables salient to Latinos on factors that promote or inhibit sexuality-related communication among Latino parents and their children. It was interesting to observe that Mexican identity was associated with endorsement of beliefs that hinder communication about sexuality and to familism. Familism in turn, was associated with variables that seemed to promote conversations about sexuality such as mother-daughter connectedness and daughter's autonomy. Familism is a multidimensional construct (Perez and Cruess, 2011) and we contend that any cultural value may guide behavior in positive and negative ways. Familism as preserving honor may influence endorsement of beliefs that preclude open communication about sexuality. And familism as interconnectedness, seeing family as role models, and support may influence endorsement of mother-daughter connectedness and daughter's autonomy. Past research on the influence of familism on other aspects of sexual health indicate that endorsing values of familism as a guardian of the family honor discourages individuals from disclosing their HIV serostatus and sexual orientation (Simoni et al., 1995; Roldan, 2007). Conversely, adoption of sexual health preventive practices such as HIV testing among Latino youth is associated with endorsing values of familism as support, family commitment and emotional closeness (Ma and Malcolm, 2015).

Our study yielded other interesting findings. We observed a positive association between acculturation and frequency of conversations about sexuality and an inverse relationship between acculturation and Mexican identity. As previously mentioned, Mexican identity was associated with endorsement of beliefs that hinder sexuality-related conversations. Past research indicates that acculturation is positively associated with vaccination uptake (Gerend et al., 2013). However, past research did not elucidate on the factors that may be driving the effect. A potential explanation is that acculturation is associated with increased access to vaccination. An alternative explanation is that sociocultural normative beliefs change with acculturation. Our findings suggest that acculturation may be related to vaccination uptake because it may facilitate sexuality-related conversations. It may be that as families acculturate more to United States culture, reduced endorsement of normative beliefs that shape how sexuality is viewed and hence, that preclude open communication about sexuality with children occurs. Testing these hypotheses can be a fruitful avenue for future research.

In conclusion, characteristics and beliefs that promote communication about sexuality such as perception that sexuality is a normal part of development, perceiving sexuality as a normal part of life, realizing that daughter is likely to be sexually active, that parents may not be aware when sexual debut occurs, and believing that it is the parents' responsibility to talk about sexuality with children because otherwise daughters may not achieve their full potential in life may also be factors that underlie Latina mothers motivation to adopt sexual health preventative behaviors for children. On the other hand, endorsement of taboos about sexuality, using heuristics as a prompt to judge readiness for conversations about sexuality, feeling as not having the correct information and reduced connectedness and trust among the dyad were factors that hindered sexuality-related communication. These same barriers to communication may be barriers to adopt sexuality preventive behaviors for children.

Our study has several limitations including a small sample size that may have reduced the power to detect associations, a cross-sectional design that precludes causality inferences, and the use of scales that have not been validated in Spanish. Furthermore, we did not inquire about health care utilization which is a factor that may influence HPV vaccination. However, we attempted to temper these issues by employing a mixed methods design, approaching our data analysis and interpretation by integrating findings, and employing a recommended standardized strategy to translate instruments and check item interpretation prior to administration of measures. Our survey measures had adequate reliability.

Our findings have implications for interventions to promote sexual and reproductive health and vaccination in Latino families. According to the IMB model of preventative behavior, providing information about vaccine benefits, safety and effectiveness will be an important aspect of any intervention. However, the IMB posits that providing information is not enough. Interventions need to address factors shown to enhance or deter motivation to perform the behavior along with providing behavioral skills to enhance facilitators and remove barriers. Thus, a potential approach would be a psychoeducational intervention for dyads designed to motivate communication about sexuality by highlighting the importance of familism as interconnectedness and mother as role model and trusted source of information while recognizing daughters' autonomy. In terms of the provision of behavioral skills, such an intervention can be designed to increase connectedness, trust and self-efficacy of dyads to engage in open communication about sexuality while highlighting the link between adoption of preventive measures and achievement of daughters' hopes and dreams.

CRediT authorship contribution statement

Julia Lechuga: Conceptualization, Methodology, Software, Validation, Formal analysis, Resources, Writing - original draft, Writing - review & editing, Supervision, Funding acquisition. **Carla Prieto:** Formal analysis, Writing - original draft, Validation. **Holly Mata:** Conceptualization, Writing - review & editing. **Ruth Ann Belknap:** Conceptualization, Writing - original draft, Writing - review & editing. **Isabel Varela:** Formal analysis, Data curation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Preparation of this manuscript was supported in part, by center grant P30-MH52776 from the National Institute of Mental Health and by grant R21NR013247-01 from the National Institute of Nursing Research awarded to the first author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2020.101105.

References

American Cancer Society (ACS, 2015). Cancer facts and figures for Hispanics/Latinos 2015-2017. American Cancer Society, Atlanta.
Aronowitz, T., Morrison-Beedy, D., 2004. Behaviors in impoverished African American girls: the role of mother-daughter connectedness. Res. Nurs. Health 27, 29–39.
Baseman, J.G., Koutsky, L.A., 2005. The epidemiology of human papillomavirus infections. J. Clin. Virol. 32, 16–24.
Bauman, S., 2005. The reliability and validity of the brief acculturation rating scale for Mexican-Americans-II for children and adolescents. Hisp. J. Behav. Sci. 27, 426–441.
Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3, 77–101.
Brislin, R.W., 1970. Back-translation for cross-cultural research. J. Cross-Cult. Psychol. 1 (3), 185–216.
Colon, R., 1998. Causal relationships of familial influence and adolescents' attitude towards substance use in the theory of planned behavior: a social impact model. Dissert. Abstr. 59, 2482.
Commendador, K.A., 2010. Parental influences on adolescent decision-making and contraceptive use. Pediatr. Nurs. 33, 147–170.
Fisher, J.D., Fisher, W.A., Shuper, P.A., 2009. The information–motivation–behavioral skills model of HIV preventive behavior. In: DiClemente, R.J., Crosby, R.A., Kegler, M.C. (Eds.), Emerging Theories in Health Promotion Practice and Research. Jossey-Bass, San Francisco, CA, pp. 21–63.
Creswell, J.W., Hanson, W.E., Clark Plano, V.L., Morales, A., 2007. Qualitative research designs: selection and implementation. Counsel. Psychol. 35, 236–264.
Galbraith, K.V., Lechuga, J., Jenerette, C.M., Moore, A.D., Palmer, M.H., Hamilton, J.B., 2016. Parental acceptance and uptake of the HPV vaccine among African-Americans and Latinos in the United States: a literature review. Social Sci. Med. 159, 116–126.
Gerend, M.A., Zapata, C., Reyes, E., 2013. Predictors of Human Papillomavirus vaccination among daughters of low-income Latina mothers: the role of acculturation. J. Adolesc. Health 53, 623–629.
Hovell, M., Sipan, C., Blumberg, E., Atkins, C., Hofstetter, C.R., et al., 1994. Family influences on Latino and Anglo adolescents' sexual behavior. J. Marriage Family 56, 973–986.
Hopfer, S., Garcia, S., Duong, H.T., et al., 2017. A narrative engagement framework to understand HPV vaccination among Latina and Vietnamese women in a Planned Parenthood setting. Health Educ. Behav. 44 (5), 783–1747.
Hutchinson, M.K., 2002. The influence of sexual risk communication between parents and daughters on sexual risk behaviors. Family Relat. 51, 238–247.
Kim, J.J., Goldie, S.J., 2008. Health and economic implications of HPV vaccination in the United States. New Engl. J. Med. 359, 821–832.
Krieger, J.L., Kam, J.A., Latz, M.L., Roberto, A.J., 2011. Does mother know best? An actor-partner model of college age women's human papillomavirus vaccination behavior. Human Commun. Res. 37, 107–124.
Lopez, G., 2015. Hispanics of Mexican origin in the United States. Pew Research Center. Accessed 4/14/2020 at https://www.pewresearch.org/hispanic/wp-content/uploads/sites/5/2015/09/2015-09-15_mexico-fact-sheet.pdf.
Lugo Steidel, A.G., Contreras, J.M., 2003. A new familism scale for use with Latino populations. Hispan. J. Behav. Sci. 25, 312–330.
Ma, M., Malcolm, L.R., 2015. Cultural influences on HIV testing among Latino Youth. Cult. Health Sex. 19 (4), 470–480.
Markus, H.R., Kitayama, S., 1994. A collective fear of the collective: implications for selves and theories of selves. Personal. Soc. Psychol. Bull. 20 (5), 568–579.
Meneses, L.M., Orrell-Valente, J.K., Guendelman, S.R., Oman, D., Irwin, C.E., 2005. Racial/ethnic differences in mother-daughter communication about sex. J. Adolesc. Health 39, 128–131.
O'Sullivan, L.F., Meyer-Bahlburg, H.F.L., Watkins, B.X., 2001. Mother-daughter communication about sex among urban African American and Latino families. J. Adolesc. Res. 16 (3), 269–292.
Painter, J.E., Viana, De O., Mesquita, S., Jimenez, L., Avila, A.A., Sutter, C.J., 2019. Vaccine-related attitudes and decisión-making among uninsured, Latin American immigrant mothers of adolescent daughters: a qualitative study. Human Vacc. Immunotherap. 15, 121–133.
Perez, G.K., Cruess, D., 2011. The impact of familism on physical and mental health among Hispanics in the United States. Health Psychol. Rev. 8, 95–127.
Raffaelli, M., Green, S., 2003. Parent-adolescent communication about sex: retrospective reports by Latino college students. J. Marriage Family 65 (2), 474–481.
Reagan-Steiner, S., Yankey, D., Jeyarajah, J., Elam-Evans, L.D., Curtis, R., et al., 2016. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years: United States, 2015. Morb. Mortal. Wkly. Rep. 62 (33), 850–858.
Riemer, H., Shavitt, S., Koo, M., Markus, H.R., 2014. Preferences don't have to be personal: expanding attitude theorizing with a cross-cultural perspective. Psychol. Rev. 121 (4), 619.
Roberts, M.E., Gerrard, M., Reimer, R., Gibbons, F.X., 2010. Mother-daughter communication and Human Papillomavirus vaccine uptake by college students. Pediatrics 125, 982–989.
Rodriguez, N., Mira, C.B., Paez, N.D., Myers, H.F., 2007. Exploring the complexities of familism and acculturation: central constructs for people of Mexican origin. Am. J. Commun. Psychol. 39, 61–77.
Rodriguez, S.A., Savas, L.S., Baumler, E., Nyitray, A.G., Mullen, P.D., et al., 2018. Parental predictors of HVP vaccine initiation among low-income Hispanic females aged 11–17 years. Vaccine 36, 5084–5090.
Roldan, I., 2007. AIDS stigma in the Puerto Rican community: an expression of other stigma phenomenon in Puerto Rican culture. Rev. Inter. Psicol. 41, 41–48.
Romo, L.F., Bravo, M., Cruz, M.E., Rios, R.M., Kouyoumdjian, C., 2010. "El sexo no es malo": maternal values accompanying contraceptive use advice to young Latina adolescent daughters. Sex. Res. Soc. Policy 7, 118–127.
Simoni, J.M., Mason, H.R.C., Marks, G., Ruiz, M.S., Reed, D., et al., 1995. Women's self-disclosure of HIV infection: Rates, reasons, and reactions. J. Consult. Clin. Psychol. 63, 474–478.
Steinberg, L., Silverberg, S.B., 1986. The Vicissitudes of autonomy in early adolescence. Child Dev. 57, 841–851.
Tashakkori, A., Teddlie, C., 2010. Mixed Methods in Social and Behavioral Research. Sage, Los Angeles, CA.
Zimer-Gembeck, M.J., Collins, W.A., 2008. Autonomy development during adolescence. In: Adams, G.R., Berzonsky, M. (Eds.), Blackwell Handbook of Adolescence. Blackwell Publishing, Malden, MA.
Zea, M.C., Asner-Self, K.K., Birman, D., Buki, L.P., 2003. The abbreviated multidimensional acculturation scale: empirical validation with two Latino/Latina samples. Cult. Divers. Ethnic Minor. Psychol. 9, 107–126.