Journal of Community Health (2019) 44:844–856
https://doi.org/10.1007/s10900-019-00636-7

REVIEW

Exploring HPV Knowledge, Awareness, Beliefs, Attitudes, and Vaccine Acceptability of Latino Fathers Living in the United States: An Integrative Review

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Published online: 7 March 2019

Abstract

To conduct an integrative review to identify and synthesize studies exploring human papillomavirus (HPV) knowledge, awareness, beliefs, attitudes, and acceptability of the HPV vaccine among Latino fathers living in the United States. The review methodology was informed by those developed by Whittemore and Knafl, which allow for the inclusion of qualitative, quantitative, and mixed methods studies. Using the preferred reporting items for systematic reviews meta-analyses guidelines, five electronic databases (PubMed, Medline, PsycINFO, CINAHL, Science Direct) were searched for peer-reviewed, full-text studies published in English with samples that included Latino fathers and examined knowledge, awareness, beliefs, attitudes about the HPV and the HPV vaccines. Studies that did not provide information on the inclusion of fathers in the sample were excluded. Identified eligible studies were analyzed and synthesized using the matrix method. Eleven eligible studies were identified. Most (n = 10) included mothers and fathers. One study included only fathers, and this study determined that although fathers held positive attitudes toward the HPV vaccine, a notable number of participants were unsure of or had not formed an opinion about the HPV vaccine. Fathers felt that a recommendation from their child's physician would impact whether they vaccinated their child. Moreover, of the ten studies including both parents, only two specifically compared fathers' and mothers' knowledge and awareness about the HPV and vaccine acceptability. These two studies determined that fathers were less aware of the HPV and had lower HPV vaccine-related knowledge than mothers. Nevertheless, all of the 11 examined studies, found moderate to high acceptability of the HPV vaccine among Latino parents despite uncertainty about possible vaccine risks and costs. Only 11 studies were identified that included Latino fathers. Of these studies, only one was conducted exclusively with Latino fathers and two compared fathers and mothers. Additional research focusing on Latino fathers is needed given the central role of the family in the Latino culture and the shared role fathers and mothers have in decision-making related to their children's health.

Keywords Human papillomavirus · HPV · HPV vaccine acceptability · Latino · Fathers · HPV knowledge

Background

Latinos or Hispanics (hereafter referred to as Latinos) are the largest and most rapidly growing minority population group in the United States (US), and are estimated to represent 30% of the US population by 2050 [1]. Cancer is the leading cause of death among Latinos, surpassing cardiovascular disease [2, 3]. Although Latinos have lower incidence rates than non-Hispanic whites for the most common type of cancers, it is estimated that 30% of Latino men and women will be diagnosed with cancer during their lifetime [2].

Human papillomavirus (HPV) is the most common sexually transmitted virus in the US and is a significant public health concern [4–6]. HPV is etiologically linked to cancers of the

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cervix, vulva, vagina, penis, and anus [5, 6]. Existing research shows that certain types of HPV-related cancers disproportionally affect Latinos [5, 6]. In 2014, about ten in 100,000 Latinas were diagnosed with cervical cancer compared with about eight in 100,000 women of all races [7, 8]. Latino men have a rate of cancer of the penis that is 1.3 per 100,000 men, compared to 0.7 per 100,000 men of all races [7, 8].

Prevention is the most efficient and cost-effective mechanism for reducing HPV, and this can be accomplished through vaccination and safe sex practices, including abstinence, condom use, and monogamous relationships [7]. The Centers for Disease Control and Prevention and the Advisory Committee on Immunization Practices recommends that males aged 11 to 21 and females aged 11 to 26 years receive the HPV vaccine [8, 9]. Nonetheless, vaccine uptake remains remarkably low [7], and Latinos have suboptimal HPV vaccination rates [10–12]. Differences in HPV vaccine completion rates between non-Hispanic Whites and minority, high-risk population groups such as Hispanic adolescent females and males have been documented [12–17]. It is estimated that increased vaccination and screening coverage for minority population groups has the potential to substantially decrease HPV incidence and mortality attributable to cervical cancer by approximately 83% [18, 19].

Although a number of studies have been conducted to identify HPV knowledge and awareness, and acceptability of the HPV vaccination among Latino population groups [13, 14, 18, 20–23], only very limited research is specific to Latino fathers. In general, the extant literature has focused on mothers, with a few studies including both mothers and father [14, 20, 21]. Results of this limited research suggest that fathers are less aware of HPV and its health consequences and have lower HPV vaccine-related knowledge [12, 13]. Given the importance of the family in the Latino culture, and the central role fathers play within the family, understanding Latino fathers' knowledge, awareness, beliefs, and attitudes about HPV and the HPV vaccine acceptability will likely make it possible to design interventions to increase HPV vaccination rates among their children and decrease their HPV-related cancer risk [10, 12, 13]. Therefore, this integrative review sought to: (1) identify and summarize findings from existing studies examining Latino fathers' knowledge, awareness, beliefs, and attitudes about the HPV and the HPV vaccine; (2) highlight the limitations of reviewed studies; and (3) generate suggestions for future research.

Methods

The methods employed by this review were informed by those developed by Whittemore and Knafl [24], which allow for the inclusion of qualitative, quantitative, and mixed methods studies. The review included three key steps: (1) a systematic literature search; (2) data evaluation involving a thematic analysis process—data reduction, data display, and drawing and verifying conclusions; and (3) presentation of conclusions. In addition, we used the reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement to guide the inclusion and exclusion of research papers [25]. The PRISMA statement guidelines include four-phase to systematically guide the inclusion and exclusion of research papers in systematic reviews [25]. In addition, the PRISMA guidelines provide a 27-item checklist for each section of the review (e.g., title, abstract, introduction, methods, results, discussions, funding) to ensure that systematic reviews are properly conducted and reported [25].

Search Strategy

Five electronic databases—PubMed, Medline, PsycINFO, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Science Direct were searched. The search, conducted between May 2018 and August 2018, was limited to full-text, peer-reviewed articles published in English between January 2000 and August 2018 that examined Latino fathers' or both parents' HPV knowledge awareness, beliefs and attitudes, and vaccine acceptability. Search terms included the following: *human papillomavirus* OR *human papilloma virus* OR *HPV* AND *male* OR *boys* AND *females* OR *girls* AND *adolescent* OR *teenagers* OR *young adult* OR *child** AND *Hispanic* OR *Latino* AND *knowledge* OR *attitude* OR *belief* and *father* OR *parent* OR *family*.

Two authors (PS, ACL) independently examined the titles and abstracts of all identified citations. Studies were excluded when both authors determined that the study did not meet the inclusion criteria for this review (discussed below). Next, these two authors independently reviewed the full articles of studies that were not excluded based on titles or abstracts. They also searched the reference lists of the full articles that satisfied the inclusion criteria to identify additional potentially eligible studies. These two authors then agreed upon a final set of articles and examined the articles to extract the relevant information pertaining to the objectives of this review. The search strategy using the PRISMA flow diagram is illustrated in Fig. 1.

Study Selection Criteria

Qualitative, quantitative and mixed methods studies examining Latino parents' knowledge awareness, beliefs, attitudes, and vaccine acceptability were eligible for inclusion if they (1) were peer-reviewed; (2), published in English between January 2000 and August 2018; (3) included self-identified Latino fathers 18 + years of age, and (4) were conducted

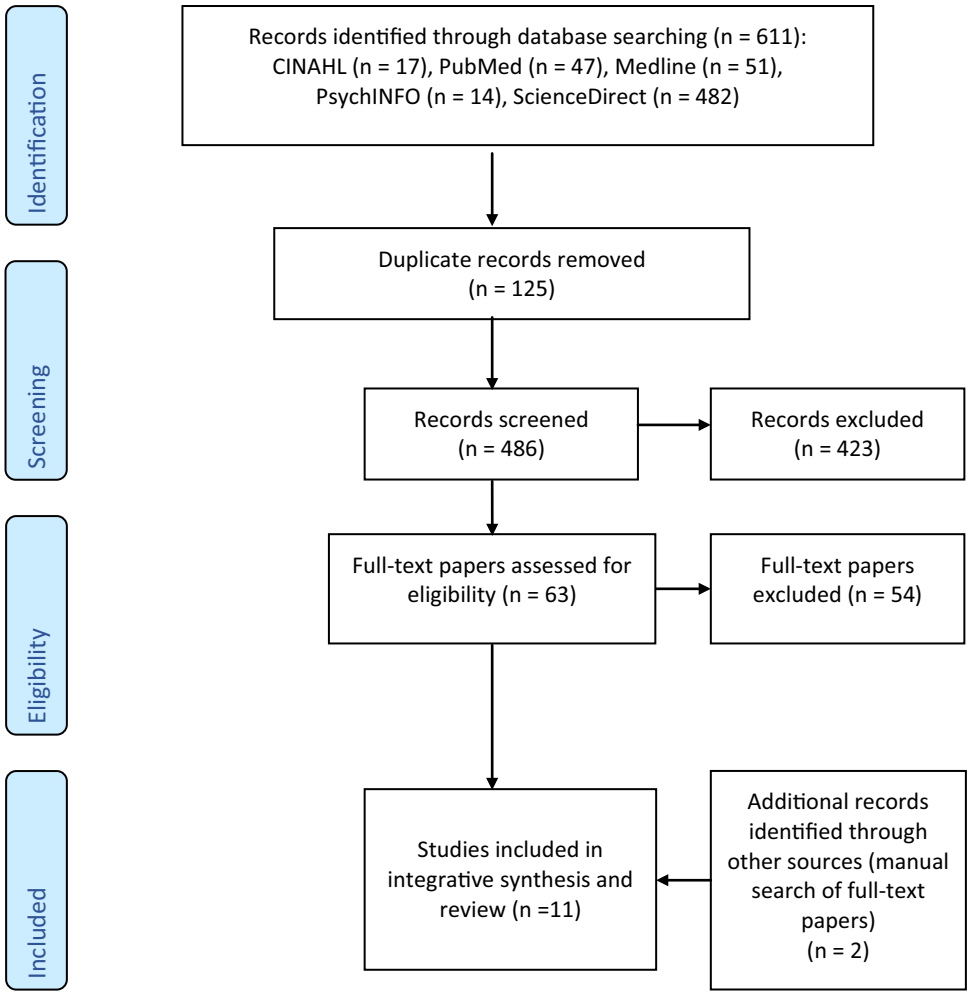

Fig. 1 Literature search strategy and flow of studies included in the integrative review. *From*: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(6): e1000097. https://doi.org/10.1371/journal.pmed10000

in the US. Reviews, case reports, or opinion publications as well as articles that included only Latino mothers were excluded. In addition, articles focused on Latinos or multiracial samples that included Latino parents but lacked information on the parents' gender were excluded. Studies including samples of Brazilian parents also were excluded.

Selection of Articles

The PRISMA statement guidelines were used to report the review process [25]. As shown in Fig. 1, the initial search identified 611 articles. After removing duplicate studies (n = 125), 486 articles were independently assessed based on title and abstract by two authors (PS, ACL). Studies were excluded when both authors determined that the study did not meet the inclusion criteria. In total, 423 articles were excluded, and 63 full-text articles were selected for further assessment. In addition, the two authors searched the reference lists of the 63 full-text articles to identify additional potentially eligible studies. They also conducted Google Scholar searches of all authors of studies that satisfied the inclusion criteria. Of the 63 full-text articles, 54 did not meet the inclusion criteria upon full-text review and were excluded for some of the various reasons mentioned above, thus yielding nine eligible articles. This manual search yielded two additional eligible studies. In total, 11 articles were selected for final inclusion in this integrative review [26–36].

Quality Appraisal

According to Whittemore and Knafl, there is no gold standard for assessing methodological quality of studies included in an integrative review [24]. For the current review, the quality of each included study was reviewed independently by two authors (ACL, SFW) using the criteria from the validated Critical Appraisal Skills Program (CASP) quality framework tool [37] for qualitative [26, 36], quantitative [28, 29, 33, 35] and mixed methods studies [27, 30–32, 34]. The CASP qualitative tool is comprised of 12 questions [37] and 10 were used in the present review to appraise mixed methods studies (n = 6) and qualitative studies (n = 2) included

in this review (see Table 1). The CASP tool for quantitative studies also includes 12 questions, and 10 of these were used to assess the quality of the examined quantitative papers (see Table 2) [37]. The two authors completing the quality review compared and discussed their ratings and resolved any differences. The 11 examined papers received high scores and were therefore acceptable for analysis (see Tables 1, 2).

Data Extraction and Synthesis

The 11 identified eligible studies were analyzed and synthesized using the matrix method [38]. Two authors (PS, ACL) independently read all articles and completed a data extraction form created to gather the following: (1) authors, (2) study setting, (3) study aim(s), (4) study population, (5) study design, (6) data collection methods, and (7) study findings. The two sets of completed data extraction forms were compared, and discrepancies were resolved with feedback from a third and fourth author (SFW, MLG). As this integrative review includes studies using qualitative, quantitative, and mixed methods designs, conducting a meta-analysis of the data was not appropriate, and results of this review are presented as a narrative summary.

Results

Study Characteristics

The qualitative, quantitative and mixed methods studies in this review included Latino fathers and explored or assessed Latino parents' HPV knowledge, awareness, beliefs, attitudes, and/or HPV vaccine acceptability. Table 3 presents a description of included studies, while studies' methodology and main findings are presented in Table 4.

Four of the 11 reviewed studies employed quantitative methods—three were cross-sectional [28, 29, 33], while one examined the effect of an intervention and employed a longitudinal study design [35]. The four quantitative studies [28, 29, 33, 35] included a total of 227 Latino fathers, with sample sizes ranging from five [29] to 189 [33] fathers.

Five of the 11 studies employed mixed methods (i.e., surveys and semi-structured interviews) [27, 30–32, 34], and

Table 1 Methodological quality assessment of mixed methods (n = 5) and qualitative (n = 2) studies

Study	Criteria											
	1	2	3	4	5	6	7	8	9	10	Total	%
Mixed methods												
Bodson et al. [27]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Warner et al. [30]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Kepka et al. [31]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Kepka et al. [32]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Kepka et al. [34]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Qualitative												
Aragones et al. [26]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90
Calo et al. [36]	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10	90

1—Clear statement of research aims, 2—Qualitative method appropriate, 3—Research design appropriate for aims, 4—Recruitment strategy appropriate for aims, 5—Data collected addressed research issue, 6—Relationship with participants considered, 7—Ethical issues considered, 8—Data analyzed sufficiently, 9—Clear statement of findings, 10—Research of value

Y yes, *N* no

Table 2 Methodological quality assessment of qualitative studies (n = 4)

Study	Criteria											
	1	2	3	4	5	6	7	8	9	10	Total	%
Colon-Lopez et al. [28]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	100
Colon-Lopez et al. [29]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	100
Kornfeld et al. [33]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	100
Kepka et al. [35]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10	100

1—Clear abstract, 2—Study purpose identified, 3—Research progresses logically, 4—Theoretical framework, 5—Sample size, 6—Ethical issues considered, 7—Operation definitions, 8—Methodology, 9—Data analyzed sufficiently, 10—Clear statement of findings

Table 3 Description of studies included in integrative review

Characteristics	Number of studies
Total number of included studies	11
Publication dates	
2010–2012 [34, 35]	2
2013–2015 [29–33, 36]	7
2016–2018 [26–28]	2
Study design	
Qualitative [26, 36]	2
Quantitative [28, 29, 33, 35]	4
Mixed methods [27, 30–32, 34]	5
Sample	
Mothers and fathers [26–32, 34–36]	10
Fathers only [33]	1
Sons and daughters [26, 27, 31–33]	5
Daughters only [30, 34–36]	4
Sons only [28, 29]	2
Born in the United States	
Puerto Ricans [28, 36]	2
Mexican-Americans [34, 35]	2
Born outside the United States (immigrants)	
Mexico [26, 27, 30–35]	8
Dominican Republic [26, 28, 29]	3
Colombia [26]	1
Ecuador [26]	1
Peru [26]	1
South America [33]	1
Central America [33]	1
Caribbean [33]	1
Other [26, 27, 30–32]	5

two employed qualitative methods [26, 36]. Both qualitative studies used focus group discussions as the data collection method. A total of four fathers participated in the two qualitative studies, with samples ranging from one [36] to three [26] fathers.

One of the 11 studies included only fathers [33], whereas 10 included both mothers and fathers [26–32, 34–36]. Nine of the 11 studies included Latino fathers of multiethnic backgrounds [26–28, 30–35], one focused on Dominican parents living in Puerto Rico [29], and one included Puerto Ricans only [36]. Furthermore, across all nine studies with multiethnic samples, the majority of parents were Mexicans or Mexican-Americans [26, 28, 30–35].

Of the 11 studies, three took place in Puerto Rico [28, 29, 36] and seven took place in three states—four in Utah [27, 30–32], two in Washington [34, 35], and one in New York [26]. Only one study included a national sample [33]. Additionally, of the 11 studies, 10 focused on HPV knowledge and awareness [26–35], six on beliefs about HPV [28, 30, 31, 33–35], four on attitudes toward HPV [26, 30, 33, 36], while eight also examined acceptability of the HPV vaccine [26, 28–31, 33–35]. The overall syntheses of themes reported across the 11 included studies is presented in Table 5 and discussed below.

Knowledge and Awareness About HPV and the HPV Vaccine

Ten of the 11 studies assessed knowledge and awareness of HPV and the HPV vaccine [26–35]. Overall, these studies determined that Latino parents had mixed levels of knowledge and awareness of HPV and the HPV vaccine. The majority of studies (n = 9) found that Latino parents had overall low to moderate awareness and limited factual knowledge of HPV and the HPV vaccine [26, 27, 29–35]. One study found that a high percentage of parents (approximately 91%) had heard of HPV infection and of the HPV vaccine (80%) [28].

Likewise, several studies (n = 8) showed that although some parents had some knowledge about HPV (e.g., is sexually transmitted disease, potential risk of their children contracting HPV; boys are at lower risk of contracting HPV than girls), parents had limited knowledge about the HPV vaccine (e.g., purpose, eligibility requirements—boys and girls, vaccine schedule, dose, cost, etc.) [26–28, 30, 31, 33–35]. For example, five studies found that parents did not know that boys could be vaccinated [27, 28, 30–32]. Additionally, three studies documented parental confusion about reasons boys should be vaccinated, as boys were perceived as being at lower risk of contracting HPV than girls [27, 31, 32].

Two studies compared fathers and mothers and showed that fathers had lower awareness of HPV and the HPV vaccine than mothers [27, 28]. In addition, results of these studies showed that among parents who had heard of the HPV vaccine, fathers had more limited knowledge about its purpose, the eligibility requirements for the vaccine, and the vaccine's dosing/schedule requirements than mothers [27, 28].

Moreover, eight studies, which included immigrant Latino parents, showed that parents born outside the US were less aware of and less knowledgeable about HPV and the HPV vaccine than those with higher levels of acculturation [26, 27, 30–32, 34, 35]. For example, eight studies found that parents born in Mexico were more likely to report not knowing about the HPV vaccine than parents born in other countries [26, 27, 30–35]. In addition, six studies showed that Latino parents born outside the US had lower awareness and factual knowledge of HPV and the HPV vaccine than those born in the US [27, 30–32, 34, 35]. Moreover, two studies showed that among Latino immigrant parents, those who had

Table 4 Characteristics of studies included in the integrative review

No	Author (s), year, country	Aim	Methods	Sample size	Results
1	Bodson et al. [27], Utah	To assess socio-demographic factors associated with HPV vaccine-related awareness and knowledge among Hispanic/Latino parents and guardians of dependent adolescents who were eligible to receive the HPV vaccine	Mixed methods Focus group and survey	n = 119; multiethnic Latino parents (92 mothers and 16 fathers of adolescents, aged 11 to 17 years; 9 excluded due to missing data)	Participants had moderately high awareness scores, with more than half having heard of cervical cancer (84.5%), HPV (76.4%), and the HPV vaccine (67.3%). HPV vaccine-related knowledge was low, with fewer than half the participants reporting they knew that most people are infected with HPV (32.7%), that HPV is asymptomatic among women (16.4%), that the HPV vaccine requires more than one dose (33.6) and is recommended for adolescent girls (47.3%) and boys (35.5%)
2	Colon-Lopez et al. [28], Puerto Rico	To identify correlates of HPV vaccine initiation, determine reasons why parents have not vaccinated their sons, and explore preferences in delivery channels for educational messages that might influence the HPV vaccine uptake in young Hispanic/Latino males attending a Federal Qualified Health Clinic in Puerto Rico	Quantitative Self-administered survey	n = 200; Multiethnic parents or legal guardians (177 mothers and 23 fathers) of young males, aged 9–17 years)	Nearly 30% of the parents reported that their sons had initiated the HPV vaccine regimen. Healthcare provider recommendation was significantly associated with vaccine initiation. Among parents of unvaccinated sons, the main reason for not getting their son vaccinated was they did not know that boys were allowed to get the vaccine
3	Aragones et al. [26], New York	To elucidate Latino immigrant parents' knowledge, attitudes, beliefs, and barriers regarding HPV vaccination for their children	Qualitative Focus groups	n = 36; multiethnic Latino parents (~ 33 mothers and ~ 3 fathers) of adolescents, aged 9–17 year	Three major findings were identified from the focus groups: (1) low levels of awareness and knowledge of HPV and the HPV vaccine, (2) high confidence that parent can get the vaccine for their eligible child, and (3) lack of healthcare provider recommendation as the main barrier to vaccination
4	Colon-Lopez et al. [29], Puerto Rico	To examine HPV knowledge and HPV vaccine acceptability among parents of boys attending a Federally Qualified Health Center in Barrio Obrero, Santurce, Puerto Rico, a neighborhood in which a cluster of this community is highly prevalent	Quantitative Self-administered survey	n = 60; Dominican immigrant parents (55 mothers and 5 fathers) of adolescent sons, aged 9–17 years	More than half the parents had not received proper HPV vaccine orientation from a healthcare provider (58.3%) or asked the provider about vaccination recommendation for their adolescent sons (56.7%). Most parents were aware of HPV (91.7%), and that males can receive the HPV vaccine (55.0%). Among those with unvaccinated sons, willingness to vaccinate the son within the next year was high (83.8%)
5	Kepka et al. [31], Utah	To explore demographic factors related to HPV vaccine awareness, interest, and uptake in Utah	Mixed methods Focus groups and self-administered survey	n = 118; multiethnic Latino parents or guardians (97 mothers and 18 fathers; 3 missing) of adolescents, aged 11–17 years	About half of parents (49.1%) reported that their daughter had received at least one dose of the HPV vaccine and 23.4% reported that their son had Parents/guardians reported limited knowledge as the main barrier to vaccine receipt. Among parents/guardians with vaccinated daughters, 92.6% did not know the vaccine requires three doses. Adjusting for income, low-acculturated parents were more likely than high-acculturated parents to report inadequate information
6	Kepka et al. [32], Utah	To explore factors related to the HPV vaccine knowledge, interest, and uptake among Latinos in Utah	Mixed methods Self-administered survey and focus groups	n = 67; multiethnic Latino parents or guardians (60 mothers and 7 fathers) of adolescents, aged 11–17 years	More parents who had lived in the US for 15 + years had vaccinated their daughters (43.6 vs.32.5%) compared to those living in the US for less time. Parents born in Mexico reported their son had not received the HPV vaccine (74.6% vs. 58.3%, $p = 0.049$) more than those born elsewhere. Parents born in Mexico and or of Mexican ancestry reported not knowing about the HPV vaccine as the main barrier to vaccinating daughters (47.1 vs. 5.9%, $p = 0.002$ for both) and sons (birthplace 38.3 vs. 10.3%, $p = 0.007$; ancestry 37.1% vs. 11.1%, $p = 0.013$) compared to those born or descending elsewhere. Less acculturated parents with a son were more likely to report not knowing about the HPV vaccine as the main barrier to vaccine receipt (47.6 vs. 12.5%, $p < 0.001$)
7	Calo et al. [36], Puerto Rico	To explore the role of ethnic identity on the attitudes toward HPV vaccine advertising among island Puerto Rican parents and non-vaccinated females	Qualitative Focus groups	Total sample = 23. Of whom 7 were; Puerto Rican parents or guardians (6 mothers and 1 father) of daughters aged 16–26 years	Several themes that may influence attitudes toward HPV vaccine were identified, including: physical ethnic similarity, relevance of information, and sociocultural congruence
8	Warner et al. [30], Utah	To assess Latino parents' perceptions of the HPV vaccine	Mixed methods Focus group and Short survey	n = 52; multiethnic Latino parents (45 mothers and 7 fathers) or guardians of daughters aged 11–17	Parents had limited knowledge about HPV vaccines. Vaccine costs and lack of strong provider recommendations were the main barriers to vaccine receipt

Table 4 (continued)

No	Author (s), year, country	Aim	Methods	Sample size	Results
9	Kornfeld et al. [33] United States	To assess awareness and knowledge of HPV, and HPV risk factors, and to examine attitudes regarding HPV vaccination in a convenience sample of immigrant Hispanic men. Additionally, vaccine acceptability was assessed among a subset of the Hispanic fathers who share parental consent	Quantitative Interviewer-administered survey	n = 189; multiethnic Latino fathers, age 9–26 years	Most participants were willing to vaccinate their adolescent son (87.5%) or daughter (78.8%) against HPV. Additionally, attitudes about vaccines generally and HPV vaccine specifically were positive. However, among this sample, awareness of HPV was low, and knowledge of key risk factors varied. Furthermore, accurate knowledge of risk factors for HPV and cervical cancer varied in this sample
10	Kepka et al. [34], Washington State	To explore the in-depth perspective of Latino parents on a sensitive topic related to adolescent sexual health and to use findings to develop a culturally tailored public health intervention to address parental concerns	Mixed methods Focus groups and elicitation interviews (EI)	n = 69; Mexican–American parents or guardians of daughters, aged 9–14 years Interviews: 25 Mothers 11 fathers Focus Groups: 22 Mothers 11 Fathers	Overall, participants demonstrated low levels of awareness of HPV and the HPV vaccine. About one-third (33%) of the participants had not yet heard of the HPV vaccine, and more than half (56%) were unfamiliar with the major cause of cervical cancer. When informed of the HPV vaccine, parents expressed a range of perceived barriers related to making the decision to vaccinate their daughters. Many parents felt that their daughters were too young to receive a vaccine to prevent a sexually transmitted infection such as HPV (19%). A large portion of the parents were concerned about the vaccine's possible side effects (36%)
11	Kepka et al. [35], Washington State	To investigate whether messages delivered via a radionovela to improved HPV and HPV vaccine-related knowledge and attitudes	Quantitative Intervention Participants were randomized to either the intervention (i.e., 5-min radionovela with facts about the HPV and the HPV vaccine) or control condition (5-min Spanish radio program) to complete the evaluation activity	n = 88; Mexican–American parents or guardians (78 mothers & 10 fathers) of daughters, aged 9–17 years	Among the 88 participants, 32% (n = 28) reported that their daughter had already received the HPV vaccine—33% in the intervention group (n = 15) and 31% in the control group (n = 13) (p = 0.34). Furthermore, about 56% of participants (n = 48) had already heard about the HPV vaccine from a radio or television program or announcement prior to this study, 56% in the intervention group (n = 25) and 56% in the control group (n = 23) (p = 0.55). Parents who received the intervention scored higher on six knowledge and belief items. They were more likely to confirm that HPV is a common infection (70% vs. 48%, p = 0.002), to deny that women are able to detect HPV (53% vs. 31%, P = 0.003), to know vaccine age recommendations (87% vs. 68%, P = 0.003), and to confirm multiple doses (48% vs. 26%, P = 0.03) than parents in the control. The intervention improved HPV and HPV vaccine knowledge and attitudes

Table 5 Theme development

Knowledge/awareness of HPV/HPV Vaccine	Beliefs	Attitudes	Acceptability/willingness to vaccine
Mixed levels of knowledge and awareness of the HPV and the HPV vaccine among both parents (fathers and mothers) Fathers have lower awareness of the HPV and the HPV vaccine and its purpose compared to mothers Limited factual knowledge of the HPV and of the HPV vaccine among parents Confusion and lack of knowledge regarding boys being able to get the HPV vaccine Parents with lower acculturation level had lower awareness of the HPV and the HPV vaccine	Mixed beliefs about the HPV vaccine Negative beliefs about the HPV vaccine Beliefs the vaccine would promote sexual activity and increase promiscuity Belief that sons are NOT at risk of contracting the HPV Beliefs about potential issues of vaccine safety and side effects Religious beliefs influence some parents decision to vaccinate their children Belief that the HPV vaccine was not needed because the school did not require it Beliefs about the importance of receiving information about the HPV and the HPV vaccine from their health care providers	Parents feel strongly about vaccinating their children Parents are eager to learn more about the vaccine Parents would most likely vaccinate their children if recommended by physician Parents do not feel comfortable speaking to their children about the HPV vaccine-encourage sexual activity Age is an important factor in initiating a conversation about HPV vaccines Concerns about vaccine side effects Misconception about insurance - leading parents to avoid having their children vaccinated Parents who lack insurance have concerns about vaccine cost (too expensive) Parents believe ethnic identity plays an important role in advertisements about the HPV and the HPV vaccine Parents desire improved access to culturally and linguistically appropriate education materials Parents hold positive attitudes towards HPV/HPV vaccine education given in schools & church	Parents of unvaccinated children are willing to vaccinate their children Parents are willing to vaccinate their children if the vaccine were free or less than $10 Parents are willing to vaccinate their children even with a lack of understanding about the vaccine Providers advice and counseling is a major influence on parents' willingness to vaccinate their children because they can reassure concerns of potential side effects Acculturation level is associated with levels of awareness about the HPV vaccine and proxies of acculturation level (i.e., birth and number of years lived in the USA) are associated with children's receipt of the HPV vaccine Parents desire culturally and linguistically appropriate educational materials and clear information about HPV vaccine

lived in the US for ≥ 15 years were more likely to have their daughters vaccinated [34, 35].

Finally, five studies found that parental educational level was associated with awareness and knowledge of HPV and the HPV vaccine [27, 31, 32, 34, 35]. For example, a study conducted in Utah [27] found that parents with a high school diploma or higher educational achievement had higher awareness and knowledge (e.g., had heard of cervical cancer and the HPV vaccine) than those with lower levels of education.

Beliefs About and Attitudes Toward the HPV and the HPV Vaccine

Six of the 11 included studies examined Latino parents' beliefs about HPV and the HPV vaccine [28, 30, 31, 33–35]. These studies included both parents and did not differentiate between fathers' and mothers' beliefs and attitudes. Overall, these studies determined that parents held mixed beliefs about the HPV vaccine [28, 30, 31, 33–35]. For example, two studies showed that parents believed that their daughters were too young (9–14 years old and 9–17 years old, respectively) to be sexually active and therefore did not need to be vaccinated [34, 35]. Similarly, one study found that parents did not believe their sons were at risk of contracting HPV and did not need to be vaccinated [30].

Three studies found that parents were not comfortable talking with their children about the HPV vaccine because they thought it would encourage sexual activity [26, 30, 33]. Furthermore, three studies found that some parents believed that the HPV vaccine would promote sexual activity and promote promiscuity among their children [32, 34, 35]. In addition, these three studies found some parents believed there are risks associated with the HPV such as autism, hyperactivity, and more [30, 34, 35]. One study found that some parents believed that the vaccine was not needed since their children's school did not require it [30], whereas two studies reported that parent's religious beliefs impacted their decision about vaccinating their children [30, 32].

Finally, the six studies examining HPV beliefs revealed that parents believed that it was important that their children's physicians be the person who provides information about HPV and the HPV vaccine [28, 30, 31, 33–35]. In addition, two of these studies found that most parents believed that having their doctors discuss the importance and safety of the HPV vaccine would influence their decision to vaccinate their children [33, 34].

Four of the 11 included studies assessed parents' attitudes toward to HPV and the HPV vaccine [26, 30, 33, 36]. Overall, these studies showed that parents felt strongly about getting their children vaccinated for HPV to protect their child's health [26, 30, 32, 33]. Two studies found that parents were eager to learn more about HPV and the HPV vaccine. Additionally, these studies determined that of parents felt that if their children's physician recommended the HPV vaccine, they would be more likely to vaccinate their children [26, 33].

Children's age was also an important factor in deciding whether to initiate conversations with adolescents about HPV vaccines [26, 30]. Moreover, two studies reported that parents were supportive of schools disseminating information about HPV through children's curriculum and that some parents preferred that HPV education be provided through the church [26, 30].

Two studies found that parents' attitudes toward vaccinating their children were associated with not understanding whether the vaccine was covered by their insurance [30, 33]. One study found that parents' misconceptions about insurance coverage (i.e. not being covered by insurance) were barriers to having their children vaccinated [30]. Furthermore, for parents who lacked knowledge about whether their insurance covered the HPV vaccine, cost was an important determinant in deciding whether to vaccinate their child, with parents believing that the cost of the vaccine would be too expensive [30, 33].

Concerns about risks associated with the HPV vaccine negatively influenced parents' attitudes toward vaccinating their children [26, 30, 33]. Parents mentioned incorrect concerns about several side effects of the HPV vaccine, including infertility, irregular menstruation, behavioral issues, pain, autism, and even death [30, 33]. In addition, three studies revealed that parents feel they need to learn more about the HPV vaccine from a physician before making a decision to vaccinate their children [26, 30, 33]. Furthermore, one study found that parents perceived a lack of support for the HPV vaccine among members in the Latino community [30].

Finally, four studies showed that ethnic identity played an important role in influencing parents' attitudes toward the vaccine [30, 34–36]. For example, one study [36] showed that participants felt it was important that HPV and HPV vaccine advertisements targeting Latino parents are culturally appropriate and appeal to Latinos by featuring people who share similar physical characteristics. In addition, two studies conducted in the Washington State with Mexican immigrant and Mexican–American parents, documented the importance of interventions taking into account Latino parents' literacy levels and integrate cultural-relevant messages. For example, these studies [34, 35] found that parents were receptive to messages provided in Spanish using fotonovela and radionovela with appropriate literacy level (low) and integrating culturally-relevant characters embedded with a familiar sociocultural context [34, 35].

Willingness to Vaccinate and Acceptability of the HPV Vaccine

Eight of the 11 studies assessed willingness to vaccinate and acceptability of the HPV vaccine, and overall findings of these studies showed moderate to high acceptability of the vaccine among parents [26, 28–31, 33–35]. Furthermore, seven studies found that parents of unvaccinated children were willing to consider vaccinating their children [26, 28–31, 33, 34].

Across the eight studies, several factors were found to influence parents' acceptability of the HPV vaccine and willingness to vaccinate. Overwhelmingly, the majority of studies (n = 7) found that receiving advice and a recommendation from their child's physician were perceived as being crucial factors that positively influenced their acceptability of the HPV vaccine and vaccination [26, 28–31, 33, 34]. Furthermore, three studies determined the lack of provider's advice and recommendation to vaccinate their children were reported barriers to vaccinating their children [26, 29, 30]. Moreover, three studies found that parents expressed willingness to vaccinate if their children's physician provided advice and reassurance related to their concerns about potential side effects of the vaccine [26, 29, 30].

A child's age (too young) [26, 28–31, 33, 34], vaccine's cost (e.g., not free) and insurance-related cost (e.g., high cost of deductible) [26, 28, 29], social norms [26, 28–31, 33, 34], and not understanding that boys should be vaccinated [28–31] negatively influenced parents' acceptability of the HPV vaccine and willingness to vaccinate. In contrast, two studies did not find differences in parents' willingness to vaccinate their child based on their gender [26, 33].

Five studies determined that parents' acculturation level, birthplace, and number of years lived in the US were associated with parents' willingness to vaccinate and acceptability of the HPV vaccine [28–33]. Furthermore, three of these studies found that parents born in the US and those who had resided in the US for more than 15 years were more likely to report having vaccinated their children against HPV than those who had recently moved to the US [31–33].

Discussion

Certain types of HPV-related cancers disproportionally affect Latinos [5], and the most efficient and cost-effective mechanism for combating HPV is to prevent infection, which can be accomplished through vaccination and behavioral habits, such as abstinence, condom use, and monogamous relationships [7]. HPV vaccination is a safe and effective primary prevention strategy for HPV-related cancers, yet rates of vaccine uptake remain low among Latinos [7, 10–12]. To date, studies examining HPV knowledge, awareness, beliefs, attitudes, and vaccine acceptability among Latino fathers are limited [33]. Understanding HPV and HPV vaccine-related knowledge, awareness, beliefs, attitudes, and vaccine acceptability of Latino fathers will likely make it possible to improve their knowledge and increase their acceptability of the HPV vaccine, which will ultimately improve the vaccination rates among their children, thereby decreasing their cancer risk. Therefore, the focus of this integrative review was to: (1) identify and synthesize findings from existing studies examining Latino fathers' HPV knowledge, awareness, beliefs and attitudes about the HPV and the HPV vaccine for their sons and daughters, (2) highlight the limitations of reviewed studies; and (3) generate suggestions for future research.

Of the 11 eligible identified studies, only one study focused specifically on Latino fathers [33], whereas 10 included fathers and mothers [26–32, 34–36]. Nevertheless, fathers' representation in these studies was considerably low (from 8.3 to 31.9% of the sample) compared to mothers' representation (from 68.1 to 91.7%) [26–32, 34–36].

Findings from the one study [33] with a national sample of Latino fathers, most of whom were foreign-born (the majority were from Mexico), showed that although almost half were aware of HPV, knowledge of the HPV was low, and gaps related to transmission and risky behaviors existed [33]. Nonetheless, most fathers had a positive attitude (73%) toward the HPV vaccine and reported a high willingness to vaccinate their adolescent sons (87.5%) or daughters (78%) [33]. Almost 95% of fathers reported that if their children's physician's recommended HPV vaccine it would influence their decision to vaccinate their children [33]. These findings concur with previous research with other minority populations documenting that although parents are willing to vaccinate their children, a physician's recommendation is a central influence on the uptake of the HPV vaccination [13, 39, 40].

Of the 10 studies that included both parents, only two [27, 28] presented findings that compared fathers' and mothers' HPV knowledge and awareness, HPV vaccine-related knowledge, and vaccine acceptability. Results of these two studies showed that fathers had lower knowledge and awareness of HPV and lower HPV vaccine-related knowledge than mothers [27, 28]. For example, Bodson et al. [27] found that fathers' awareness of the HPV and the HPV vaccination were significantly lower compared to mothers. Furthermore, Colon-Lopez et al. [28] found that Latino fathers were 88% less likely than mothers to report that their sons had initiated the HPV vaccine regimen. Combined results of these studies [27, 28, 33] suggest the need for educational efforts to increase awareness and knowledge of the HPV and the HPV vaccine among Latino fathers.

As mentioned previously, a notable finding of this review was fathers' and mothers' acknowledging the central

importance of their child's physician's recommendation of the HPV vaccine in their willingness to vaccinate their children [26, 28–30, 33–35]. Nevertheless, this review also found that the lack of a healthcare provider's recommendation was among the main barriers reported by parents for not initiating vaccination of their children [26, 28–30, 33–35]. These findings concur with other available research [26, 28–30] and highlight the importance of renewed efforts to increase physicians' discussion and recommendation of the HPV vaccine, which can significantly influence Latino parents' decisions to vaccinate their children. Furthermore, consistent with previous research conducted with other racial/ethnic groups [41–45], additional barriers identified to vaccination include confusion about whether male adolescents should also be vaccinated [28–31], a child's age (too young) [26, 28–31, 33, 34], cost (e.g., not free, high cost of deductible) [26, 28, 29], and social norms [26, 28–31, 33, 34].

In addition, this review found that Latino immigrant parents with lower acculturation levels were less aware of and less knowledgeable about the HPV and the HPV vaccine and also were less likely to report that their sons and daughters had initiated the HPV vaccine regimen than those with higher acculturation levels [26, 27, 31, 32, 35]. These findings are supported by previous studies with minority population groups including Latino immigrants [46–49] and suggest that educational efforts and interventions to promote increased awareness, knowledge, acceptability, and uptake of the HPV vaccine should take parents' acculturation levels into account. In fact, the only intervention study included in this review highlighted the importance of linguistic and culturally appropriate and relevant HPV educational messages targeting Latinos [29–36]. This is important, as culturally sensitive interventions developed with input from Latino parents will likely have a greater impact than interventions that do not take into account linguistics and culture to increase the effectiveness of interventions targeting Latino parents.

Finally, the majority of fathers participating in the studies included in this review were Mexican-Americans or Mexican immigrants. Given the heterogeneity of the Latino population, future research examining Latino fathers' HPV and HPV vaccine-related knowledge awareness and acceptability among multiethnic Latino groups is needed to provide further information relevant for the development of interventions tailored to the needs of this ethnically diverse population group.

Research Limitations

Findings from this integrative review should be interpreted in light of some limitations. First, the review was limited to five databases. It is possible if more databases had been used, additional studies would have been identified. In addition, the eligibility of full-text, published, and English articles may have limited the inclusion of studies published in Spanish. Additionally, this review is focused only on studies conducted in the US. Furthermore, the gray literature (non-formally published scholarly work such as theses and dissertations, working papers, technical reports, etc.) was not captured in this review. Finally, studies that did not explicitly provide information on parents' gender or the inclusion of fathers were excluded.

Limitations of the included studies should also be noted: the majority (10/11) of included studies did not: (1) focus solely on fathers, (2) included a very small number of fathers; (3) present findings related to fathers separately, or (4) explicitly compared findings between fathers and mothers. Strengths of this integrative review include the use of systematic criteria (PRISMA) [25] to identify eligible studies, the use of the matrix method to analyze and synthesize the included studies [38], and the use of the CASP quality assessment tools for the critical appraisal of studies [37]. Furthermore, the inclusion of qualitative, quantitative and mixed methods articles strengthens the validity of the literature included in this review.

Conclusion

In summary, this review identified only one study conducted exclusively with Latino fathers and two that compared fathers and mothers' HPV knowledge, awareness, beliefs, attitudes, and vaccine acceptability. Given evidence suggesting the influence fathers have on health care decisions made for their children and the fact that information from this review showed parents' high interest in learning more about the HPV and the HPV vaccine, additional research to fill current gaps among this population group is sorely needed. This information is likely to provide important insights for developing interventions tailored to the needs of Latino fathers and aimed at increasing their knowledge of the HPV and the HPV vaccine and consequently increasing the vaccine uptake of their adolescent sons and daughters.

Acknowledgements Paloma Suárez completed this research as part of an internship (Dr. Ana Cristina Lindsay, Mentor) awarded as part of *the Exito! Latino Cancer Research Leadership Training* program hosted by the Institute for Health Promotion Research at the University of Texas Health Science Center at San Antonio with funding by the National Cancer Institute (NCI Grant 2R25CA134301-06), for which Dr. Amelie G. Ramirez is Principal Investigator. The authors are grateful for library assistance provided by Ms. Teresa Maceira, reference librarian at the University of Massachusetts Boston.

Compliance with Ethical Standards

Conflict of interest The authors declare no conflicts of interest.

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