EMPIRICAL RESEARCH

A Longitudinal Test of the Parent–Adolescent Family Functioning Discrepancy Hypothesis: A Trend toward Increased HIV Risk Behaviors Among Immigrant Hispanic Adolescents

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Abstract Parent-adolescent discrepancies in family functioning play an important role in HIV risk behaviors among adolescents, yet longitudinal research with recent immigrant Hispanic families remains limited. This study tested the effects of trajectories of parent–adolescent family functioning discrepancies on HIV risk behaviors among recent-immigrant Hispanic adolescents. Additionally, we examined whether and to what extent trajectories of parent-adolescent family functioning discrepancies vary as a function of gender. We assessed family functioning of 302 Hispanic adolescents (47 % female) and their parent (70 % female) at six time points over a three-year period and computed latent discrepancy scores between parent and adolescent reports at each timepoint. Additionally, adolescents completed measures of sexual risk behaviors and alcohol use. We conducted a confirmatory factor analysis to determine the feasibility of collapsing parent and adolescent reported family functioning indicators onto a single latent discrepancy variable, tested model invariance over time, and conducted growth mixture modeling (GMM). GMM yielded a three-class solution for discrepancies: High-Increasing, High-Stable, and Low-Stable. Relative to the Low-Stable class, parent–adolescent dyads in the High-Increasing and High-Stable classes were at greater risk for adolescents reporting sexual debut at time 6. Additionally, the High-Stable class was at greater risk, relative to the Low-Stable class, in terms of adolescent lifetime alcohol use at 30 months post-baseline. Multiple group GMM indicated that trajectories of parent-adolescent family functioning trajectories did not vary by gender. Implications for future research and practice are discussed.

Keywords HIV • Alcohol use • Family functioning • Discrepancies • Adolescents

Introduction

HIV represents a major public health concern among adolescents in the U.S. (CDC 2015). Adolescence is a developmental period of increased risk for HIV infection, and Hispanic youth disproportionately engage in HIV risk behaviors, including sexual risk and alcohol-related activities (Johnston et al. 2015; Kann et al. 2014), placing them at greater risk for HIV infection (Córdova et al. 2011; Tello et al. 2010). Family functioning, defined as the combination of parent–adolescent communication, family communication, parent support, parental monitoring of peers, family cohesion, and positive parenting, has been shown to offset risks for Hispanic adolescent HIV risk behaviors (Cano...
et al. 2016; Córdova et al. 2012). Researchers have also found that parent–adolescent family functioning discrepancies, defined as the gap (in either direction) between parent and adolescent reports of family functioning, are cross-sectionally associated with increased likelihood of Hispanic adolescent HIV risk behaviors (Córdova et al. 2014c).

Because these findings are cross-sectional, however, little is known about developmental changes in parent–adolescent family functioning discrepancies and their effects on HIV risk behaviors among recently immigrated Hispanic adolescents, a population that may experience disruptions in family functioning as a result of immigration (Smokowski et al. 2008). Over the next five decades, it is projected that newly arrived Hispanic immigrants will account for 25 % of U.S population growth (Pew Research Center 2015), underscoring the need for research on this population. Hispanics are also a young population, with approximately 40 % under age 20 (Ennis et al. 2011). Given these various research needs, our goal in the present study was to advance the literature on longitudinal changes in parent–adolescent discrepancies in reports of family functioning, and effects of these discrepancies on HIV risk behaviors, among recently arrived Hispanic adolescents and their parents. Specifically, the purpose of this study was to (1) examine longitudinal invariance in latent family functioning variables for both parents and their adolescents over time, (2) map trajectories of parent–adolescent family functioning discrepancies, and (3) ascertain whether, and to what extent, these trajectories predict HIV risk behaviors at Time 6 (2½ years post-baseline) among recently immigrated Hispanic adolescents. Additionally, we sought to examine whether and to what extent trajectories of parent–adolescent family functioning discrepancies vary as a function of the adolescent’s gender.

Prevalence of HIV Risk Behaviors and HIV in Hispanic Adolescents

Hispanic youth disproportionately engage in a number of HIV risk behaviors, including sexual risk and alcohol-related activities. National surveillance data indicate that Hispanic 9–12th grade youth (6.4 %) are more likely to report sexual debut, as compared to non-Hispanic White 9–12th grade adolescents (3.3 %; Kann et al. 2014). When compared to Black 9–12th grade adolescents (35.3 %), Hispanic 9–12th grade youth (41.7 %) are more likely to report unprotected sex at last sexual intercourse (Kann et al. 2014). Beyond the risks posed by sexual risk behaviors, alcohol use is also prominent among Hispanic youth. Alcohol use can be considered as an HIV risk behavior because many episodes of unprotected sex with strangers or casual acquaintances occur under the influence of alcohol (Córdova et al. 2014a, b, c). Relative to non-Hispanic White (65.9 %) and Black 9–12th grade youth (63.4 %), Hispanic 9–12th youth (72.4 %) are more likely to report lifetime alcohol use (Kann et al. 2014). Hispanic 9–12th grade youth (37.5 %) are also more likely to report current alcohol use when compared to non-Hispanic White (36.3 %) and Black 9–12th grade adolescents (29.6 %; Kann et al. 2014). Given that sexual risk and alcohol-related behaviors increase the risk for HIV infection, it is not surprising that Hispanics are disproportionately affected by HIV. Despite accounting for 17.4 % of the total U.S. population (U.S. Census Bureau 2014), Hispanics accounted for 23 % of all HIV infections in 2013 (CDC 2015).

Antecedents of Hispanic Adolescent HIV Risk Behaviors

Family and developmental factors help to determine which Hispanic youth will engage in HIV risk behaviors. Indeed, scientists have consistently found that higher levels of family functioning, including parent–adolescent communication, family communication, parent support, parental monitoring of peers, family cohesion, and positive parenting, are associated with decreased likelihood of HIV risk behaviors in Hispanic adolescents (Farrelly et al. 2013; Malcolm et al. 2012). For example, Córdova and colleagues (2011) found that family functioning was inversely related to current alcohol use among Hispanic adolescents. Investigators have also demonstrated the ways in which parent–adolescent discrepancies in family functioning play an important role in adolescent mental health and risk taking outcomes (Ohannessian et al. 2000; Schwartz et al. 2013). For example, discrepancies in parent–adolescent family functioning predict greater likelihood of alcohol use (Ohannessian 2012), sexual debut, and unprotected sex (Córdova et al. 2014c) among youth.

Although the literature on family functioning discrepancies is growing and informative, it is generally not developmentally informed. The majority of studies are cross-sectional and do not permit developmental inferences to be drawn—and they do not provide information on how these discrepancies unfold. Within a very limited body of work, researchers have shown that parent–adolescent family functioning discrepancies represent a dynamic process that unfolds over time and are longitudinally linked to adolescent risk behaviors (De Los Reyes et al. 2010; Reynolds et al. 2011). For example, De Los Reyes and colleagues (2010) found that mother–adolescent parental monitoring discrepancies significantly predicted African American adolescent delinquency at two-year follow-up.

The notion that family functioning discrepancies are dynamic may be particularly true among Hispanic
families—and especially among families who have recently immigrated. Specifically, Hispanic immigrated parents and adolescents not only may begin to differentially perceive how well the family functions, or not, as part of normal developmental processes, but also may experience acculturation discrepancies (Schwartz et al. in press; Unger et al. 2009). Given that, relative to their parents, adolescents are often provided more opportunities to integrate into U.S. culture (e.g., English speaking peers and American school system), they Americanize at levels that far outpace their parents. These parent-adolescent acculturation discrepancies have been associated with family functioning (Schwartz et al. 2015; Unger et al. 2009). For example, researchers have found that larger parent–adolescent Hispanicism discrepancies, defined as the difference between parents’ and adolescents’ orientation toward Hispanic cultural practices (e.g., comfort and use of language and traditions), were significantly related to lower adolescent reports of family functioning (Córdova et al. 2014c).

Beyond acculturation discrepancies, gender may play an important role in parent-adolescent family functioning discrepancies (Ohannessian et al. 1995). Given that investigators have shown that child rearing practices among Hispanic families can vary by gender (Córdova et al. 2014a; Marsiglia et al. 2014), it should not be surprising that the effects of parent-adolescent family functioning discrepancies on Hispanic adolescent HIV risk behaviors vary as a function of gender (Córdova et al. 2014c). For example, Córdova et al. (2014c) found that, relative to males, the influence of family functioning discrepancies on lifetime alcohol use was stronger for females. However, this study was cross-sectional, and therefore only within-time associations between parent-adolescent family functioning discrepancies and Hispanic adolescent HIV risk behaviors can be inferred.

Whereas some investigators have demonstrated that, relative to their parents, youth perceive family functioning more negatively (Ohannessian 2012), others have found adolescents to have more favorable views of family functioning (Schwartz et al. 2013). The effects of the specific direction of the discrepancy on risky behaviors are also not completely clear. Whereas De Los Reyes et al. (2010) found that families where parents reported higher levels of family functioning relative to their child’s reports were associated with increased risk for delinquent behaviors, Schwartz et al. (2013) found adolescents who perceived family functioning to be more positive than their parents to be at greater risk for unprotected sex.

Although our understanding of the role of family functioning on Hispanic adolescent HIV risk behaviors has advanced significantly over the last decade, several critical gaps remain in the empirical literature. First, researchers assessing family functioning have relied solely on either parent or adolescent reports of family functioning (De Los Reyes 2011, 2013). Research on adolescent risk behaviors should utilize reports both from parents and from adolescents (Ohannessian 2012)—and should examine discrepancies between them—which may provide a fuller understanding of family-level antecedents of risk behaviors. Second, although limited research has been conducted to examine the effects of parent-adolescent family functioning discrepancies on adolescent outcomes, even fewer studies have applied the parent–adolescent discrepancy approach to examine adolescent HIV risk behavior outcomes (Córdova et al. 2014b, c; Ohannessian 2012). Third, a substantial proportion of research on family functioning discrepancies has been cross-sectional or short-term longitudinal (e.g., Ohannessian 2012; Reynolds et al. 2011; Stuart and Jose 2012). Longer-term longitudinal studies in this area have been extremely rare. Fourth, of the limited studies examining the longitudinal effects of family functioning on HIV risk behaviors, few have used both parent and adolescent reports and have used multiple indicators of family functioning (e.g. Schwartz et al. 2013; Smokowski et al. 2014). Fifth, studies that examine parent–adolescent family functioning discrepancies with Hispanic populations are limited (e.g. Córdova et al. 2014c). To the best of our knowledge, no study to date has tested the effects of discrepancies in adolescents’ and parents’ perceptions of multiple indicators of family functioning (i.e., family communication, parent–adolescent communication, family cohesion, parental monitoring of peers, parent support and parental involvement) on recent-immigrant Hispanic adolescent HIV risk behaviors over time.

An Ecodevelopmental and Discrepancy Framework to Test the Parent–Adolescent Family Functioning Discrepancy Hypothesis

Two central tenets of ecodevelopmental theory (Szapocznik and Coatsworth 1999) guide our testing of the parent–adolescent family functioning hypothesis. First, ecodevelopmental theory—a risk and protective factors framework—affirms that the family is the most proximal system to youth development, and therefore may be the most influential in preventing HIV risk behaviors among Hispanic youth (Szapocznik and Coatsworth 1999). Second, social interactions and developmental processes that unfold over time shape Hispanic adolescent HIV risk behaviors. Thus, youth influence, and are influenced by, the family system over time. Based on these notions, ecodevelopmental theory, including social-interactional and developmental processes, accounts for the trajectories of parent–adolescent family functioning discrepancies and their
effects on adolescent HIV risk behaviors in several important ways. Parallel with ecodevelopmental theory, family is the most proximal and influential system and is the focus of the present study (i.e., parent-adolescent family functioning discrepancies). Furthermore, in line with social interaction theory, parent-adolescent family functioning discrepancies do not occur in isolation, but rather through daily parent-adolescent social interactions whereby both parent and adolescents influence and are influenced by each other. Moreover, given that adolescents, relative to their parents, may begin to differentially perceive how well the family functions, incorporating a developmental framework into understanding parent-adolescent family functioning discrepancies is essential. Taken together, ecodevelopmental theory, including social interaction and developmental aspects, may provide a more systemic understanding of the effects of family functioning discrepancies on Hispanic adolescent HIV risk behaviors over time (De Los Reyes and Kazdin 2005; Ohannessian 2012). Ecodevelopmental theory has been strongly supported in studies with Hispanic adolescents and provides a robust framework for the present study.

The Present Study

Given the limitations of existing literature, in the present study we sought to (1) test model invariance of latent parent and adolescent family functioning variables over time, (2) model trajectories of parent-adolescent family functioning discrepancies, and (3) test whether, and to what extent, these trajectories predict HIV risk behaviors among recent-immigrant Hispanic adolescents. Given cross-sectional and short-term longitudinal findings that trajectories involving large and increasing parent-adolescent family functioning discrepancies are linked with increased likelihood of HIV risk behaviors among youth (Córdova et al. 2014c; Ohannessian 2012), we hypothesized discrepancies will be linked with increased likelihood of recent-immigrant Hispanic youth engaging in HIV risk behaviors. Additionally, we sought to examine whether, and to what extent, trajectories of parent-adolescent family functioning discrepancies vary as a function of the adolescent’s gender.

Methods

Data were taken from a longitudinal study on acculturation and health risk behaviors in Hispanic youth residing in Miami-Dade and Los Angeles Counties. The study was approved by the Institutional Review Boards at the University of Miami and the University of Southern California, and by the Research Review Committees at each of the respective participating school districts. Additional study details are reported in Schwartz et al. (2012, 2015).

Participants

Participants were recruited between May and November 2010 from randomly selected public schools comprised of ≥75 % Hispanic youth located in Miami-Dade (k = 10) and Los Angeles (k = 13) counties. To be eligible for this study, youth had to have (a) arrived in the US within 5 years of the baseline assessment, and (b) be either entering or finishing the 9th grade. The study sample consisted of 302 Hispanic parent-adolescent dyads. Among adolescents, 53 % were boys, and the mean age was 14.51 years at baseline (SD = 0.88 years, range 14–17).

Among parents, participants were primarily mothers (70 %), followed by fathers (24.9 %), stepfathers (2 %), steppmothers (1.3 %), 1 % other, and grandmother and grandfather each at 0.3 %, respectively. Participants reported mean annual household incomes of $34,521 (SD = $5398) in Los Angeles and $27,028 (SD = $13,454) in Miami. Relative to families in Los Angeles (n = 150; Median = 3 years, interquartile range = 1–4 years), families in Miami (n = 152; Median = 1 year, interquartile range = 0–3 years) reported being in the United States for less time at baseline. Additionally, whereas Los Angeles families were primarily from Mexico (70 %), El Salvador (9 %), Guatemala (6 %), and other Hispanic countries (15 %), Miami families were predominantly from Cuba (61 %), the Dominican Republic (8 %), Nicaragua (7 %), Honduras (6 %), Colombia (6 %), and other Hispanic countries (12 %).

Procedures

Parents provided consent, adolescents assent and parental consent for adolescents <18 years of age, respectively, and were assessed six times over a three-year time period, corresponding to baseline and 6, 12, 18, 24, and 36 months post-baseline. Parent-adolescent dyads completed the assessment at the same time, in separate rooms, and in the language of their choice (i.e., English or Spanish) using an audio computer assisted self-interviewing (A-CASI) methodology. Parents received $40 at baseline, with increments of $5 at each subsequent time point, and adolescents were compensated for their participation with movie tickets at each time point. We retained 85 % of the study sample (256 of 302 families) across the six time points.
Measures

Demographics

Parent–adolescent dyads completed a demographic form in which they provided information with regard to their country of origin, gender, and age.

Family Functioning (Measured Time Points 1–6)

We assessed family functioning using parent and adolescent reports of six indicators, including positive parenting, parental involvement, family cohesion, family communication, parental monitoring of peers, and parent–adolescent communication. Cronbach’s alphas are provided as a range across time points 1–6.

Positive Parenting Positive parenting (9 items, parent \( \alpha = .71-.78 \), adolescent \( \alpha = .83-.85 \)) was assessed using the corresponding subscale from the Parenting Practices Scale (Gorman-Smith et al. 1996). The positive parenting subscale measures parenting behaviors characterized by acknowledging and rewarding desirable adolescent behaviors. Sample questions from the parent-report scale include, “When your child has done something that you like or approve of, do you give him or her a hug, a pat in the back, or a kiss for it?” and for the adolescent, “When you have done something that your parents like or approve of, how often does your mother give you a hug, a pat on the back, or a kiss for it?” The response choices ranged from “0 = Never” to “4 = Always.”

Parental Involvement Parental involvement (21 items, parent \( \alpha = .80-.84 \), adolescent \( \alpha = .86-.91 \)) was assessed using the corresponding subscale from the Parenting Practices Scale (Gorman-Smith et al. 1996). The parental involvement subscale includes a parent question such as, “In the past 6 months, about how often have you talked with your child about what he/she had actually done during the day?”, and for the adolescent, “How often did your parent talk with you about what you had actually done during the day?”, with a response range of “0 = Never” to “4 = Always.”

Family Cohesion Family cohesion (6 items, parent \( \alpha = .77-.82 \), adolescent \( \alpha = .76-.86 \)) was assessed using the corresponding subscale from the Family Relations Scale (Tolan et al. 1997). A sample statement for both parents and adolescents includes, “Family members feel very close to each other.” Response choices ranged from “1 = not true at all” to “3 = true a lot.”

Family Communication Family communication (3 items, parent \( \alpha = .62-.77 \), adolescent \( \alpha = .67-.78 \)) was assessed using the corresponding subscale from the Family Relations Scale (Tolan et al. 1997). A sample statement for both parents and adolescents includes, “My family knows what I mean when I say something.” Response choices ranged from “1 = not true at all” to “3 = true a lot.”

Parental Monitoring of Peers Parental monitoring of peers (5 items, parent \( \alpha = .83-.86 \), adolescent \( \alpha = .86-.90 \)) was assessed via the Parent Relationship with Peer Group Scale (Pantin 1996), which asks the extent to which parents supervise youths’ friends, activities, and whereabouts. A five-point Likert-type scale, ranging from 1 (Not at all) to 5 [Extremely well (often)], was used to record responses. A sample parent question is “How often during a typical week do you supervise your child and his or her best friends spending time together?” and for youth, “How often during a typical week do your parents supervise you and your best friends spending time together?”

Parent–Adolescent Communication Parent–adolescent communication (20 items, parent report \( \alpha = .85-.88 \), adolescent report \( \alpha = .89-.91 \)) was assessed using the Parent–Adolescent Communication Scale (Barnes and Olson 1985). A sample parent question is “I am very satisfied with how my child and I talk together,” and for adolescents, “I am very satisfied with how my mother and I talk together.” Response choices ranged from 1 (Strongly disagree) to 5 (Strongly agree).

Adolescent HIV Risk Behaviors (Measured at Time 6)

Youths’ sexual debut was measured by one item that asked, “Have you ever had vaginal, anal, or oral sex?” Unprotected sex was measured by one item that asked, “Have you ever had vaginal or anal sex without using a condom?” Lifetime and current (90 days prior to the assessment) alcohol use were assessed using items from the Monitoring the Future survey (Johnston et al. 2015). For the purposes of this study, separate binary variables were created to assess each HIV risk behavior. These variables were coded as 1 if the youth had engaged in the behavior in question, and 0 otherwise.

Analytic Approach

Analyses were conducted using Mplus version 7 (Muthén and Muthén 1998–2012). Missing data were handled using full information maximum likelihood (FIML), which is the default in Mplus. According to values suggested by Little (2013), good model fit is represented as CFI ≥ .95, RMSEA ≤ .05, and SRMR ≤ .06; and adequate fit is represented as CFI ≥ .90, RMSEA ≤ .08, and SRMR ≤ .08.
The analytic approach proceeded in four steps. First, we computed descriptive statistics on the demographic and HIV risk variables, and for the parent and adolescent family functioning scores. We computed factor scores at each time point of family functioning using six indicators (i.e., parent-adolescent communication, family communication, parental monitoring of peers, family cohesion, parent involvement, and positive parenting) for both parent and adolescent. Additionally, using multivariate logistic regression models for both parents and adolescents, we conducted attrition analyses to predict attrition after time point 1. In all of the comparisons across aggregated classes, we included gender, family income, years in the United States, age, and site as covariates for both the parent and adolescent models.

Second, we conducted a longitudinal confirmatory factor analysis (LCFA) to ascertain the feasibility of collapsing six indicators of family functioning into single latent variables for parents and adolescents and sought to establish the extent to which the structure of the latent family functioning variables for parents and adolescents was equivalent over time. We compared three models: (a) configural invariance, which assumes that the same configuration of factors and indicators fits the data across time (with no other equality constraints applied), (b) metric invariance, where each factor loading is constrained equal across time, and (c) scalar invariance, which constrains factor loadings and intercepts of indicators over time (Little 2013). We compared the configural and metric models, and the metric and scalar models, as nested model comparisons using the CFI (ΔCFI < .010 represents invariance) and RMSEA (ΔRMSEA < .010 represents invariance; Cheung and Rensvold 2002, Little 2013). We report the Δχ² index, but do not use this index to evaluate model fit because it tends to be overpowered, producing significant differences in fit even when such differences are small (Meade et al. 2008). Then, we computed family functioning discrepancy scores at each time point from a multilevel modeling approach (Kim et al. 2013; Schwartz et al. in press). The discrepancy score for each family functioning indicator at each time point was computed as the latent difference between parent and adolescent scores on that indicator at the time point. This latent difference was computed by random slope models via a dyadic coding system by weighting parent reports .5 and adolescent reports .5 (Kim et al. 2013; Schwartz et al. in press).

Third, we estimated growth mixture models (GMM) with maximum likelihood estimation to examine linear slopes to specify the number of class trajectories for parent-adolescent family functioning discrepancies (Jung and Wickrama 2008). The Akaike Information Criteria (AIC), Bayesian Information Criterion (BIC), and sample-adjusted BIC were used to select the best model. Smaller values for all indices indicate a better fitting model (Li et al. 2001; Muthén 2004). Entropy assesses how well people are classified into classes and ranges from 0 to 1, with >.80 indicating more distinct groups (Acoc 2008; Muthén 2004). The Vuong-Lo-Mendell-Rubin (VLMR) test provides a p value indicating whether model fit is significantly improved by adding one more class (Tolvanen 2007). To examine whether and the extent to which the classifications of parent-adolescent family functioning discrepancy trajectories vary as a function of gender, we specified gender (0 = Male, 1 = Female) as a predictor of the class solution using the pseudoclass method (Wang et al. 2005). The pseudoclass method randomly allocates individuals into pseudoclasses via a random draw based on the estimated conditional probabilities that the individual comes from each class, then examines the pseudoclass adjusted residuals relative to their null distributions (Wang et al. 2005). We interpreted the paths from gender to class membership as multinomial logistic analyses.

Fourth, we tested whether and to what extent the trajectories of parent-adolescent family functioning discrepancies predicted adolescent HIV risk behaviors (i.e., sexual debut, unprotected sex, lifetime and current alcohol use) at time point 6. We included covariates to account for group differences based on gender, age, years in the United States, and site.

Results

Step 1: Descriptive Statistics

Descriptive analyses indicated that, at Time 6, 36.3 % (87 out of 240) of youth (mean age = 17.5 years, SD = 0.88 years, range 17–20) reported sexual debut (lifetime oral, vaginal, or anal sex), and 51.7 % (46 out of 89) reported lifetime unprotected sex (see Table 1). Approximately 25.3 % (61 out of 241) reported lifetime alcohol use, and of these adolescents, 45.2 % (28 out of 62) reported past-90-day alcohol use at Time 6. Parent and adolescent family functioning scores are reported in Table 1. Relative to adolescents, parents reported higher means on all indicators of family functioning across the six time points (see Table 2).

Multivariate logistic regression models for adolescents indicated no significant differences on demographic variables (i.e., gender, family income, years in the United States, age, and site) between participants and non-participants after time point 1. Multivariate logistic regression models for parents suggest that parents who had resided in the United States longer (M = 4.95 years) were more likely to drop out of the study after time point 1, as...
Table 1  Adolescent HIV risk behaviors at time point six

<table>
<thead>
<tr>
<th>Risk behaviors</th>
<th>Adolescents (n = 302)</th>
<th>Class 1: Low-stable (n = 157)</th>
<th>Class 2: High-increasing (n = 66)</th>
<th>Class 3: High-stable (n = 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Sexual debut</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>153</td>
<td>63.7</td>
<td>68.4</td>
<td>62.7</td>
</tr>
<tr>
<td>Yes</td>
<td>87</td>
<td>36.3</td>
<td>31.6</td>
<td>37.3</td>
</tr>
<tr>
<td>Lifetime unprotected sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>48.3</td>
<td>46.7</td>
<td>53.0</td>
</tr>
<tr>
<td>Yes</td>
<td>46</td>
<td>51.7</td>
<td>53.3</td>
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<tr>
<td>Lifetime alcohol use</td>
<td></td>
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<tr>
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<td>180</td>
<td>74.7</td>
<td>76.1</td>
<td>82.0</td>
</tr>
<tr>
<td>Yes</td>
<td>61</td>
<td>25.3</td>
<td>23.9</td>
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<tr>
<td>Past-90 days alcohol use</td>
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<td></td>
</tr>
<tr>
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<td>34</td>
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<td>65.6</td>
<td>47.4</td>
</tr>
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<td>Yes</td>
<td>28</td>
<td>45.2</td>
<td>34.4</td>
<td>52.6</td>
</tr>
</tbody>
</table>

compared to parent participants who were retained throughout the study (M = 3.38 years).

Step 2: Measurement Model and Invariance Tests of Parent and Adolescent Family Functioning Over Time

Longitudinal Confirmatory Factor Analyses (LCFA) were conducted separately for adolescents and their parents. As shown in Table 3, the configural LCFA provided good model fit for both adolescents \( \chi^2(482) = 721.92, p < .001; \text{CFI} = .960; \text{RMSEA} = .041; \text{SRMR} = .058 \) and their parents \( \chi^2(482) = 726.02, p < .001; \text{CFI} = .958; \text{RMSEA} = .041; \text{SRMR} = .072 \) along with acceptable standardized factor loadings for all six family functioning indicators across all six time points (ranging from .51 to .81 for parent reports, and from .57 to .91 for adolescent reports). Building on these configural models, we sought to establish metric invariance, which constrains factor loadings to be equal across time. These constraints did not significantly decrease model fit for either adolescents \( \Delta \chi^2(25) = 31.93, p = .16; \Delta \text{CFI} = .001; \Delta \text{RMSEA} = .001 \) or their parents \( \Delta \chi^2(25) = 30.94, p = .19; \Delta \text{CFI} = .001; \Delta \text{RMSEA} = .001 \). Finally, we sought to establish scalar invariance, which constrains item intercepts (in addition to factor loadings) equal over time. Once again, there was no substantial decrease in model fit for either adolescents \( \Delta \chi^2(30) = 85.43, p < .001; \Delta \text{CFI} = .001; \Delta \text{RMSEA} = .001 \) or their parents \( \Delta \chi^2(25) = 30.94, p = .191; \Delta \text{CFI} = .001; \Delta \text{RMSEA} = .001 \) (see Table 3). We therefore concluded that both the adolescent and parent family functioning constructs were fully invariant across time.

Step 3: Identifying Number of Latent Classes

Growth mixture modeling (GMM) yielded a three-class solution. When compared to a two class solution \( (\text{BIC} = 12,004.63, \text{AIC} = 11,963.82, \text{entropy} = .85) \), the BIC and AIC decreased \( (\text{BIC} = 11,694.34, \text{AIC} = 11,642.40, \text{entropy} = .87) \) in the three class solution, indicating an improvement in model fit. Although some criteria suggested a model fit improvement in the two class solution relative to the three class solution \( (\text{VLMR} p = .13) \), selection of a class solution should not be based solely on fit indices, but also on interpretability and research question \( (\text{Geiser} 2013; \text{Jung and Wickrama} 2008) \). When compared to the two-class solution, the three-class solution included a relatively low parent-adolescent family functioning discrepancy class, thereby providing an opportunity to compare low versus high parent-adolescent family functioning discrepancy classes. Therefore, we retained the three-class solution as the most parsimonious model. Class 1, hereafter referred to as Low-Stable Parent–Adolescent Family Functioning Discrepancy \( (\text{intercept} = -.38, p < .76; \text{slope} = .03, p = .78) \), consisted of 51.7 % \( (n = 156) \) of parent–adolescent dyads in the sample. Approximately 22.5 % \( (n = 68) \) of parent–adolescent dyads were in class 2, referred to as High-Increasing Parent–Adolescent Family Functioning Discrepancy \( (\text{intercept} = -7.67, p < .001; \text{slope} = -.49, p = .008) \). Class 3 was composed of 25.8 % \( (n = 78) \) of parent–adolescent dyads, and this class is referred to as High-Stable Parent–Adolescent Family Functioning Discrepancy \( (\text{intercept} = 7.38, p < .001; \text{slope} = .55, p = .07) \). Whereas the High-Stable class was characterized by relatively higher parent reports of family functioning as compared to adolescents, and remained
stable over time, the High-Increasing class was characterized by relatively higher adolescent reports of family functioning as compared to parents, although the discrepancy remained relatively small and stable over time (see Fig. 1).

Next, we examined whether and to what extent the classifications of family functioning trajectories vary as a function of gender. Findings indicate that gender did not predict membership in the High-Increasing (\(b = .209, p = .516\); reference group = Low-Stable), High-Stable (\(b = .564, p = .060\); reference group = Low-Stable), and Low-Stable (\(b = .354, p = .324\); reference group = High-Increasing) trajectories, respectively. Because gender was not related to class membership, gender was not included in subsequent analyses.

### Step 4: Latent Classes Predicting Adolescent HIV Risk Behaviors at Time Point 6

As shown in Table 4, the High-Increasing and High-Stable classes were more likely to report sexual debut as compared to the Low-Stable class (\(OR = 1.29, p = .01\); and \(OR = 1.69, p = .004\), respectively). Further, compared to the High-Stable class, the High-Increasing class was less likely to report sexual debut (\(OR = 0.77, p = .01\)). Relative to the High-Stable and Low-Stable classes, the High-Increasing class was less likely to report lifetime alcohol use (\(OR = 0.44, p = .04\) and \(OR = 0.70, p = .03\), respectively). Compared to the Low-Stable class, the High-Stable class was more likely to report lifetime alcohol use (\(OR = 1.61, p = .01\)).

### Alternate Model Analyses

For our alternate model analyses, we examined whether a quadratic slope term would be needed to accurately represent the change patterns in parent–adolescent family functioning discrepancy trajectories. To accomplish this, we estimated a latent growth curve model with quadratic slopes for parent-adolescent family functioning discrepancy trajectory. Findings indicate that the quadratic function in the growth curve model, which serves as the baseline model of latent class growth modeling, was non-significant (mean = -.04, \(p = .29\)). Therefore, we retained the linear slope trajectories.

### Discussion

Although our understanding of the role of parent–adolescent family functioning discrepancies on adolescent problem behaviors has advanced significantly over the last decade, several critical gaps in the empirical literature exist, including studies that have longitudinal designs (e.g., Ohannessian 2012; Reynolds et al. 2011; Stuart and Jose

### Table 2 Family functioning discrepancy scores over time

<table>
<thead>
<tr>
<th>Family functioning indicator</th>
<th>Parent reports</th>
<th>Adolescent reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family cohesion Time 1</td>
<td>14.24 (2.52)</td>
<td>13.61 (3.19)</td>
</tr>
<tr>
<td>Time 2</td>
<td>15.56 (2.60)</td>
<td>13.22 (3.48)</td>
</tr>
<tr>
<td>Time 3</td>
<td>13.97 (2.73)</td>
<td>13.01 (3.56)</td>
</tr>
<tr>
<td>Time 4</td>
<td>14.44 (2.62)</td>
<td>12.89 (3.66)</td>
</tr>
<tr>
<td>Time 5</td>
<td>13.81 (2.72)</td>
<td>12.88 (3.92)</td>
</tr>
<tr>
<td>Time 6</td>
<td>14.30 (2.71)</td>
<td>12.99 (3.95)</td>
</tr>
<tr>
<td>Parent-adolescent communication Time 1</td>
<td>55.28 (9.30)</td>
<td>49.79 (13.15)</td>
</tr>
<tr>
<td>Time 2</td>
<td>55.72 (9.15)</td>
<td>49.13 (13.59)</td>
</tr>
<tr>
<td>Time 3</td>
<td>55.72 (9.16)</td>
<td>48.89 (13.51)</td>
</tr>
<tr>
<td>Time 4</td>
<td>56.27 (9.55)</td>
<td>49.84 (13.73)</td>
</tr>
<tr>
<td>Time 5</td>
<td>56.04 (9.22)</td>
<td>49.76 (13.91)</td>
</tr>
<tr>
<td>Time 6</td>
<td>56.14 (9.50)</td>
<td>50.36 (13.85)</td>
</tr>
<tr>
<td>Peer relations Time 1</td>
<td>10.33 (4.24)</td>
<td>9.38 (5.04)</td>
</tr>
<tr>
<td>Time 2</td>
<td>10.57 (4.06)</td>
<td>9.78 (5.06)</td>
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<tr>
<td>Time 3</td>
<td>10.78 (3.87)</td>
<td>10.18 (4.86)</td>
</tr>
<tr>
<td>Time 4</td>
<td>10.99 (3.90)</td>
<td>9.95 (5.11)</td>
</tr>
<tr>
<td>Time 5</td>
<td>11.28 (3.93)</td>
<td>10.68 (4.92)</td>
</tr>
<tr>
<td>Time 6</td>
<td>11.52 (3.58)</td>
<td>11.18 (4.83)</td>
</tr>
<tr>
<td>Family communication Time 1</td>
<td>6.71 (1.56)</td>
<td>6.52 (1.90)</td>
</tr>
<tr>
<td>Time 2</td>
<td>6.99 (1.53)</td>
<td>6.31 (2.07)</td>
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<td>Time 3</td>
<td>6.75 (1.73)</td>
<td>6.31 (2.08)</td>
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<td>Time 4</td>
<td>6.94 (1.58)</td>
<td>6.28 (2.09)</td>
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<tr>
<td>Time 5</td>
<td>6.57 (1.72)</td>
<td>6.38 (2.13)</td>
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<tr>
<td>Time 6</td>
<td>6.89 (1.56)</td>
<td>6.37 (2.18)</td>
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<tr>
<td>Positive parenting Time 1</td>
<td>23.34 (4.77)</td>
<td>23.17 (7.07)</td>
</tr>
<tr>
<td>Time 2</td>
<td>23.30 (4.63)</td>
<td>22.82 (6.83)</td>
</tr>
<tr>
<td>Time 3</td>
<td>23.38 (5.03)</td>
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<td>22.80 (7.07)</td>
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<tr>
<td>Time 6</td>
<td>23.84 (5.41)</td>
<td>22.49 (7.49)</td>
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<tr>
<td>Involvement Time 1</td>
<td>59.02 (8.30)</td>
<td>38.98 (10.88)</td>
</tr>
<tr>
<td>Time 2</td>
<td>58.98 (8.98)</td>
<td>39.47 (11.41)</td>
</tr>
<tr>
<td>Time 3</td>
<td>59.24 (8.66)</td>
<td>39.45 (11.51)</td>
</tr>
<tr>
<td>Time 4</td>
<td>59.65 (8.40)</td>
<td>40.05 (11.00)</td>
</tr>
<tr>
<td>Time 5</td>
<td>59.47 (8.99)</td>
<td>40.32 (12.55)</td>
</tr>
<tr>
<td>Time 6</td>
<td>59.20 (9.34)</td>
<td>40.47 (11.68)</td>
</tr>
</tbody>
</table>

Standard deviations are in parenthesis
adolescent HIV risk behavior outcomes (Córdova et al. 2014c; Ohannessian 2012), used multiple indicators of family functioning (e.g. Schwartz et al. 2013; Smokowski et al. 2014), and included Hispanic populations (e.g. Córdova et al. 2014c). The present study is among the first to examine the effects of parent–adolescent family functioning discrepancy trajectories on HIV risk behaviors among recent-immigrant Hispanic adolescents, and to incorporate longitudinal data at six points in time. In general, our findings indicate that greater parent–adolescent family functioning discrepancies—regardless of whose report was higher—predicted greater risk of sexual debut and lifetime alcohol use at Time 6. Findings support the assertion that family functioning discrepancies provide

Table 3 Measurement invariance in a longitudinal confirmatory factor analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$(df)</th>
<th>$\Delta \chi^2$ (df)</th>
<th>CFI</th>
<th>ACFI</th>
<th>RMSEA</th>
<th>RMSEA</th>
<th>SRMR</th>
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<tbody>
<tr>
<td>Parent model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural invariance</td>
<td>726.016 (482)*</td>
<td>31.931 (25)</td>
<td>.957</td>
<td>.001</td>
<td>.040</td>
<td>.075</td>
<td>.075</td>
</tr>
<tr>
<td>Metric invariance</td>
<td>757.947 (507)*</td>
<td>31.931 (25)</td>
<td>.957</td>
<td>.001</td>
<td>.040</td>
<td>.075</td>
<td>.075</td>
</tr>
<tr>
<td>Scalar invariance</td>
<td>828.599 (537)*</td>
<td>70.652 (30)*</td>
<td>.950</td>
<td>.007</td>
<td>.042</td>
<td>.078</td>
<td>.078</td>
</tr>
<tr>
<td>Adolescent model</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Configural invariance</td>
<td>721.921 (482)*</td>
<td>31.931 (25)</td>
<td>.957</td>
<td>.001</td>
<td>.040</td>
<td>.075</td>
<td>.075</td>
</tr>
<tr>
<td>Metric invariance</td>
<td>752.861 (507)*</td>
<td>31.931 (25)</td>
<td>.957</td>
<td>.001</td>
<td>.040</td>
<td>.075</td>
<td>.075</td>
</tr>
<tr>
<td>Scalar invariance</td>
<td>838.289 (537)*</td>
<td>85.428 (30)*</td>
<td>.950</td>
<td>.009</td>
<td>.043</td>
<td>.065</td>
<td>.065</td>
</tr>
</tbody>
</table>

*p < .05

Fig. 1 Parent–adolescent family functioning discrepancies trajectories

Table 4 Adolescent HIV risk behavior outcomes at time point six

<table>
<thead>
<tr>
<th></th>
<th>Lifetime alcohol use</th>
<th>Past 90-day alcohol use</th>
<th>Sexual debut</th>
<th>Lifetime unprotected sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (SE) p</td>
<td>OR (SE) p</td>
<td>OR (SE) p</td>
<td>OR (SE) p</td>
</tr>
</tbody>
</table>
| High-stable compared to low-stable | 1.61 (0.62) .01* | 2.51 (1.51) .10* | 1.68 (0.21) .004** | 0.98 (0.58) 0.08+
| High-increasing compared to low-stable | 0.70 (0.33) .03* | 2.13 (1.83) .25 | 1.29 (0.5) .01* | 0.78 (0.51) 0.13
| High-stable compared to high-increasing | 2.29 (0.21) .04* | 1.18 (0.75) .26 | 1.31 (0.30) .01* | 1.25 (0.49) 0.10+

*p < .10, *p < .05, **p < .01, ***p < .001
meaningful information with respect to adolescent health outcomes over time.

Modeling developmental changes in family functioning discrepancies advances our understanding of the dynamic nature of how parents and adolescents view how well, or not, the family functions over time. Notably, in our descriptive analyses of parent and adolescent family functioning scores, our findings are consistent with previous studies that indicate that, relative to adolescents, parents perceive more favorable views of family functioning (Ohanessian et al. 1995). Our multilevel modeling approach to developing discrepancy scores (Kim et al. 2013; Schwartz et al. in press) and growth mixture models (Jung and Wickrama 2008), however, indicated that two classes (i.e., Low-Stable and Low-Increasing) were characterized by adolescents perceiving more favorable views of family functioning as compared to parents. These findings underscore the potential that advanced methodological approaches may have in identifying subgroups that may not be identified otherwise.

Studies have affirmed that parent–adolescent family functioning discrepancies provide meaningful information on the antecedents of adolescent HIV risk behaviors (Ohanessian 2012; Reynolds et al. 2011). In fact, investigators should only accept the notion that discrepancies do not play an essential role on adolescent risk behaviors when such data exist to support this null position (De Los Reyes 2011). Similar to previous longitudinal research on family functioning discrepancies and adolescent outcomes (De Los Reyes et al. 2010; Ohannessian 2012; Reynolds et al. 2011), our findings suggest that greater parent–adolescent family functioning discrepancies increase the risk of two prominent HIV risk behaviors—sexual debut and lifetime alcohol use—among recent-immigrant Hispanic adolescents over time. Our hypothesis that the magnitude of the discrepancy would be meaningful in predicting HIV risk behaviors was partially supported. For example, relative to both the High-Increasing and High-Stable classes, the Low-Stable class was less likely to report sexual debut. However, relative to the High-Increasing class, which was characterized by adolescents perceiving family functioning as more favorable than their parents, the High-Stable class (with parents reporting more favorable family functioning) was at greater risk of sexual debut and lifetime alcohol use despite the slightly lesser discrepancy in family functioning. It is possible that discrepancies where adolescents are less positive about their families than parents may be more detrimental for adolescent HIV risk behaviors. At the same time, given that, in this sample, the prevalence of HIV risk behaviors was relatively low as compared to national surveillance data, future research should examine whether our findings hold true among higher-risk Hispanics.

From a theoretical perspective, our findings advance ecodevelopmental theory (Szapocznik and Coatsworth 1999) in at least two important ways. First, although ecodevelopmental theory posits that adolescent HIV risk behaviors are shaped by the family system over time, longitudinal studies testing this notion have been fairly scarce. Our findings indicate that reports from both parents and adolescents, and the discrepancies between them, may provide a systemic perspective of how the family perceives itself and the ways in which this perception unfolds over time. Second, the present findings suggest that greater discrepancies predict increased HIV risk behaviors over time. This implies that integrating aspects of family stress theory (in addition to a discrepancy approach) into an ecodevelopmental framework may be helpful (Patterson 2002). Developmentally, parents and adolescents may begin to differentially perceive the family system, which can increase family stress (Ohannessian 2012). This family stress process may be more pronounced among Hispanic youth, many of whom also face the challenges associated with parent–adolescent acculturation discrepancies (Schwartz et al. in press). Therefore, as developmental and acculturation discrepancies increase between Hispanic parents and youth, stress on the family becomes greater, and so culturally congruent interventions should be considered. It is possible that parent-adolescent acculturation discrepancies contribute to discrepancies in perceptions of family functioning, although this hypothesis remains to be tested empirically.

Our findings suggest potential areas for the development and refinement of family-based interventions. Indeed, family-based interventions have been shown to be among the most efficacious in preventing and reducing Hispanic adolescent HIV risk behaviors (Córdova et al. 2012; Huang et al. 2014). Although researchers have demonstrated that family functioning represents a primary mechanism through which family-based interventions reduce Hispanic adolescent HIV risk behaviors (Prado et al. 2012, 2013), to the best of our knowledge, empirically guided interventions targeting parent-adolescent family functioning discrepancies are nonexistent. Because parents have been positioned as the change agents in preventing HIV risk behaviors among Hispanic youth, family-based intervention scientists have, for the most part, focused their efforts on parent-centered approaches aimed at improving family functioning though the parent. Although the overall goal of family-based interventions may still include a focus on improving family functioning, our findings extend the literature and suggest that including modules targeting both the parent and the adolescent aimed at ameliorating parent–adolescent family functioning discrepancies may yield favorable adolescent health outcomes (Córdova et al. 2014c; De Los Reyes 2011). Now that the family functioning discrepancy
hypothesis has been tested in a longitudinal design, examining the effects of a family-based preventive intervention on family functioning discrepancies represents a next logical step.

The present findings should be interpreted in light of several important limitations. First, the sample was comprised of recent-immigrant Hispanic families from Miami and Los Angeles and is not representative of the recent-immigrant Hispanics in other parts of the United States, especially those settling in “new-receiving” cities and states. In Miami, participants were primarily of Cuban-origin, and Los Angeles participants were primarily of Mexican-origin. Therefore, our findings may not be generalizable to all Hispanic families in the United States. Second, the use of self-report measures to assess adolescent HIV risk behaviors is a limitation. It is possible that adolescents may over- or under-report HIV risk behaviors. A third limitation is that the majority of parent reports were from mothers (i.e., 70 %). Although this is consistent with research utilizing both parent and adolescent reports (e.g., Ohannessian 2012), future studies should work to engage more fathers. Relatively few studies on parent-adolescent family functioning discrepancies that have examined both father-adolescent and mother-adolescent differences exist (e.g., Leung and Shek 2014; Ohannessian et al. 1995) and this seems like an important area for future research.

Conclusion

Our findings advance the state of youth and adolescence science in several important ways. Although investigators have demonstrated the important role that parent-adolescent family functioning discrepancies play in the development of adolescent problem behaviors, longitudinal research with minority populations and HIV risk behaviors are lacking (Córdova et al. 2014a, b, c; De Los Reyes et al. 2010; Ohannessian 2012). Our findings provide important contributions to the study of adolescence in general, and specifically to the body of literature focused on parent–adolescent family functioning discrepancies by demonstrating that parent–adolescent family functioning discrepancies are dynamic, and that meaningful changes unfold over time. Furthermore, findings contribute to the state-of-the-science in adolescence and indicate that parent–adolescent family functioning discrepancies predict HIV risk behaviors among recent-immigrant Hispanic adolescents in important ways. A next important step is to apply this basic science to the development or refinement of family-based HIV preventive interventions, which could include modules focused on attenuating discrepancies in how parents and adolescents view how well their family functions. Ultimately, this line of research should be aimed at reducing and eliminating HIV health disparities experienced by the Hispanic population.

Authors’ Contributions DC conceived of the study, participated in its design and coordination, performed statistical analysis, participated in interpretation of the data, and wrote the first draft of the manuscript; SJ participated in conception and design of study, data collection, statistical analysis and interpretation of the data; JU participated in conception and design of study, data collection; LGB participated in conception and design of study, and data collection; JV participated in conception and design of study, and data collection; DS participated in conception and design of study, and data collection; SDR participated in conception and design of study, and data collection; TKL participated in statistical analysis and interpretation of the data; AM participated in statistical analysis and interpretation of the data; MAC participated in conception and design of study and interpretation of the data; ELB participated in conception and design of study, and interpretation of the data; AO participated in statistical analysis and interpretation of the data; CSW participated in conception and design of study, and interpretation of the data; AR participated in conception and design of study, and interpretation of the data. All authors read, revised and approved the final manuscript.

Conflicts of interest The authors report no conflict of interests.

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Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References


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