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Parents' Support and Knowledge of Their Daughters' Lives and Females' Early Sexual Initiation in Nine European Countries

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Abstract

Context—The association between early sexual initiation and parenting practices (e.g., support and knowledge) has not been tested in multiple European population-based samples using the same instrument.

Methods—Data provided by females (age 14-16) participating in the 2005-06 Health Behaviors in School-Aged Children (HBSC) survey conducted in Austria, Finland, Greece, Hungary, Iceland, Lithuania, Romania, Spain and Ukraine were used (n=7,466). The dependent variable was early sexual initiation (<16). The main independent variables were maternal and paternal support and knowledge of daily activities. Univariate, bivariate and multivariable analyses were run with standard error corrections and weights.

Results—Prevalence of early sexual initiation ranged from a low of 7% (Romania) to a high of 35% (Iceland). In bivariate analyses, maternal and paternal support were significantly negatively related to adolescent females' early sexual initiation in a majority of countries. In models with demographic controls, parental support was significantly negatively related to early sexual initiation (AOR = 0.80 maternal, 0.74 paternal). After adding parental knowledge, early sexual initiation was no longer associated with parental support, but was significantly negatively related to parental knowledge (AOR = 0.69 maternal and paternal). These patterns held across countries.

Conclusions—Negative associations between parental support and early initiation were largely explained by parental knowledge, suggesting either that knowledge is more important than support or that knowledge mediates the association between support and early initiation. Providers should counsel parents regarding the importance of knowledge of their daughters' daily lives, which may be enhanced through developing supportive relationships.

INTRODUCTION

Early sexual initiation is recognized as a potential threat to adolescent females' sexual health. Biological immaturity of the cervix in early adolescence increases females' susceptibility to sexually transmitted infections (STDs).¹ Further, early initiators are less

likely than those who delay initiation to use condoms or other contraceptive methods,² increasing risk for teenage pregnancy. Although the above risks can affect both males and females, in some contexts, females may experience additional negative psychosocial sequelae of early initiation, such as increases in depressive symptoms and negative peer interactions, resultant from gender differences in sexual norms.³⁻⁶ As such, delaying sexual initiation until later in adolescence or early adulthood is seen as an important goal for adolescent females' sexual and reproductive health.

Parents play an important role in promoting adolescent sexual health, including delayed intercourse initiation. A recent review of predominantly U.S.-based studies supports the protective influence of three aspects of parenting: monitoring of adolescent behavior, clear and positive communication, and parental support or emotional bonds with adolescents.⁷ Although parental monitoring has traditionally been conceptualized as tracking and surveillance,⁸⁻¹⁰ most studies relating "monitoring" to adolescent sexual behavior measure this construct with questions about parental knowledge of adolescents' daily activities. Subsequent studies have found that this knowledge is usually derived from adolescent disclosure rather than parental surveillance and tracking.⁸⁻¹⁰ The protective relationship between parental knowledge and adolescent sexual risk-taking is one of the most consistent in the literature.⁷ Positive communication has been conceptualized in terms of quality, tenor (e.g., open versus conflict-oriented) and quantity, both generally and as related to sexuality. This parenting construct has been less consistently related to adolescent sexual risk-taking across studies.⁷ Support and emotional bonding has most often been measured in terms of parental closeness (e.g., warmth, caring, support, attachment to family). This aspect of parenting can affect adolescents' sexual initiation because attachment to "conventional persons" (as defined by Problem Behavior Theory: parents, teachers, or religious leaders)¹¹ increases the potential social and relational costs of deviating from socially acceptable behavior (i.e., delayed intercourse initiation),¹² assuming that later sexual initiation is valued by conventional persons. Alternately, attachment theory suggests that parental support may undergird interpersonal skills that aid in the development of healthy peer and romantic relationships,¹³ which in turn can act as a deterrent to sexual risk-taking. It is likely that bonding and support lay a foundation for clear communication and adolescent disclosure of their activities and feelings.

Cross-national analyses have documented the fundamental salience of parental support to adolescent development and behavior, as indicated by pervasive associations with social competence, mental health, and antisocial behavior across time, culture, and method.^{14,15} This broad empirical support is consistent with classic, long-standing theories about the profound importance of attachment and "connection" in child development.¹⁶⁻¹⁸ Further, recent cross-national work indicates that adolescents agree about the behaviors that constitute supportive parenting.¹⁹

Notwithstanding the above, an understanding of how parental support relates to adolescent females' sexual risk-taking in contexts outside the U.S. is less developed. Other authors have proposed that variability in sexual behavior norms produce differences in what is considered risky sexual behavior in various countries.²⁰ For example, variability across countries in adults' acceptance of teen sexual behavior,²¹⁻²³ or the commonness of sexual initiation by age 16,²⁴ could produce or be affected by differences in how parental support influences sexual initiation at specific ages. One study conducted using convenience samples of Hungarian, Slovenian, Dutch and Swiss adolescents found that parental support was negatively related to an index of risky sexual behaviors (including early initiation), although the strength of this association varied across countries.²⁰ Another study conducted within a single country (the Netherlands) found that parental support was negatively associated with earlier initiation. These associations became non-significant, however, after

adding parental knowledge to multivariable models. Such findings could indicate either that parental knowledge is more important than parental support, or that knowledge mediates the relationship between support and adolescent behavior.²⁵

The purpose of this study is to extend prior research by examining whether perceived maternal and paternal support are related to adolescent females' early sexual initiation across nine European countries. We focus on parental support because of its likely foundational importance for other aspects of parent-teen relationships. This study extends existing research by using representative population-based data sources rather than convenience samples, and adding countries not previously studied. Our expectation was that greater perceived parental support would be negatively related to females' early initiation, and that the strength of this association would be reduced after accounting for parental knowledge. A secondary hypothesis, based on one previous comparative study,²⁰ was that parental support may be more strongly related to females' early sexual initiation in countries where early sexual initiation was less common and thus less normative. Understanding this relationship will build our knowledge of the universality or contingency of parental support and its relations with adolescent females' early sexual initiation. Results will help service providers counsel parents on practices that will be protective for adolescent females' sexual and reproductive health across contexts.

METHODOLOGY

Data

Analyses draw upon data from the Health Behavior in School-Aged Children (HBSC, 2005-06) study conducted in 41 primarily European countries in collaboration with the World Health Organization Regional Office for Europe. This is the most recent version of HBSC data available to date. HBSC was designed to examine the health and health behaviors of adolescents across country contexts.²⁶ The HBSC questionnaire includes questions on adolescent health (e.g., self-perceived health, life satisfaction, perceived symptoms, weight status), behaviors (sexual behavior, substance use, diet, physical activity, sedentary behavior, violence and bullying), and their social context (family, peer, and school relationships). Socio-demographic information such as age, gender, family composition and socioeconomic status is also requested of survey respondents.

Cluster sampling, with classes as the primary sampling units, was used to select a nationally representative sample of students. Children around the ages of 11, 13, and 15 years were recruited for the international study. The recommended sample size for each participating country was approximately 1,500 students for each age group. Data collection was conducted during the academic school-year; students completed anonymous surveys by pen-and-paper within classrooms.

HBSC follows a strict international protocol for data collection to ensure maximum comparability across countries. Questionnaires are translated from English to each country's official language(s), and then back-translated to English to minimize any translation errors or misinterpretation. Once collected, data from all countries are sent to a unique data coordinating center (in Norway) that is responsible for data cleaning, checking for inconsistencies and more generally, for combining the data from all countries into one usable international dataset. Over 205,000 students were included in the 2005-06 international HBSC dataset. The present secondary analysis was deemed exempt from IRB review by the Tulane University Biomedical IRB. Each participating country obtained approval to conduct the survey from the relevant ethics review board or an equivalent regulatory body.

The present analysis is limited to the nine European countries which had data on both sexual behavior and the optional parenting module (Austria, Finland, Greece, Hungary, Iceland, Lithuania, Romania, Spain and Ukraine). Background information about each country is provided in Table 1. Countries belong to all of the major UN regions in Europe, and vary in terms of culture, religion, economic systems, adolescent access to sexual health services, and adolescent sexual behavior.²⁷ While some countries can be considered rather liberal towards sexual behavior of adolescents (e.g. Finland, Iceland and, in some autonomous communities, Spain), others are not, either because the influence of religion is strong (e.g. Austria, Greece, Lithuania) or because of political conservatism (e.g. Hungary, Romania, Ukraine).²⁸ In 2001, the percentage of 15-year-old females who reported ever having sex ranged from a low of 9.6% in Greece to a high of 33.1% in Finland.²⁶ All countries were classified as high or upper middle income, except Ukraine, which was lower middle income.²⁹ The age of legal consent for sex varied from a low of age 13 in Spain to a high of 16 in Finland and Ukraine.^{28,30} Birth rates to 15-19 year olds also varied widely across countries, ranging from a low of 8.6 per 1,000 population in Finland to a high of 38.5 per 1,000 population in Romania.³¹ The percent of the population reporting that religion was important to them in the World Values surveys, a proxy for population religiosity, was lowest in Finland and Lithuania (14%) and was highest in Romania (51%).³²

Measures

Outcome - Early sexual initiation—This variable was constructed based on the respondent's age at data collection,^a whether they reported ever having sexual intercourse (“Have you ever had sexual intercourse [sometimes this is called ‘making love,’ ‘having sex,’ or ‘going all the way’]?”), and their reported age at first intercourse (“At what age did you first have sexual intercourse?”). The cutoff for early intercourse we specified as age 15 or younger, based on the use of this definition in other European studies of early initiation.³³⁻³⁶ Students who reported their first intercourse occurred before age 16 were coded as having early sexual initiation; those who reported never having sexual intercourse or first intercourse at age 16 or greater were coded as not having early sexual initiation.

Predictor - Parental support—In HBSC 2005-06, four questions assessing the respondent's perception of parental support were included as an optional package, drawn from the 12-item care subscale of the Parental Bonding Instrument (PBI).³⁷ The PBI has demonstrated consistent factorial structure across Australian, Spanish, and Dutch samples; it is a common measure of parental support and bonding often used in contemporary studies of psychopathology.³⁷⁻³⁹ Two support variables were constructed, one each for mother and father, based on questions asking how often the respondent's mother or father: “helps me as much as I need; is loving; understands my problems and worries; and makes me feel better when I am upset” (alpha 0.75 for mother, 0.81 for father in the present sample). Each question was answered on a four-point ordinal scale: “almost always, sometimes, never, or I don't have or see this person.” After recoding the last response option as missing,^b we conducted a principal components analysis and used item weights on the first principal component to generate a summary score. To facilitate interpretation, scores were standardized across the entire sample to have a mean of zero and a standard deviation of one. Higher scores indicate greater parental support.

^aWhen a respondent was missing reported age at first intercourse but reported ever having sexual intercourse, if their age at interview was less than sixteen years, they were coded as having experienced early intercourse.

^bWe considered recoding the “do not have or see this person” response as a numerical response as opposed to missing, but its relationship with early sexual initiation was not consistent. Additionally, adolescents did not consistently report this option across all items within an index.

Mediator – Parental knowledge—Based on the prior Dutch study and theory,^{7,40} we included adolescent females' reports of parental knowledge as a possible link between parental support and timing of sexual initiation. We derived separate measures for mother and father. Consistent with past European studies,^{40,41} these were constructed based on five questions asking how much the respondent's mother or father knows about "who your friends are, how you spend your money, where you are after school, where you go at night, and what you do with your free time." This is the core measure used in most studies of parental knowledge.¹⁰ Each question was answered on a four-point ordinal scale: "knows a lot, knows a little, doesn't know anything, or don't have or see this person" (alpha 0.79 for mother, 0.86 for father in the present sample). After recoding the last response option as missing, we conducted a principal components analysis and used item weights on the first principal component to generate a summary score. To facilitate interpretation, scores were standardized across the entire sample to have a mean of zero and a standard deviation of one. Higher scores indicate greater parental knowledge.

Control variables – demographics—We included a number of demographic characteristics as control variables. Age was included as a continuous variable, since likelihood of sexual initiation increases with age.⁴² The HBSC Family Affluence Scale (FAS) was used to capture family socioeconomic status. This control was included because socioeconomic status has been inversely related to likelihood of adolescent females' early sexual initiation.^{43,44} This scale was based on the respondent's reporting of various assets available in her household, including computers, having her own bedroom, number of cars, number of family vacations, and how well-off the respondent feels compared to her peers. Researchers have found this scale to have good reliability and validity.⁴⁵ Scores ranged from zero to seven; these were categorized to low (scores 0-3), medium (scores 4-5) and high affluence (scores 6-7), based on published guidelines to be used consistently across countries.²⁴ A third variable, family living arrangement, was included because step family and single parent living arrangements, relative to living with two biological parents, have been associated with increased odds of early sexual initiation among adolescent females in past studies.^{44,46} This variable was specified using three categories: with both biological parents, stepfamily, or single parent. No "other living arrangement" category was applicable due to sample restrictions described below. Finally, dummy variables for each respondent's country of residence were also included. This allowed for controlling for unmeasured aspects of country contexts that could influence early sexual initiation. Austria was arbitrarily chosen as referent; due to analysis techniques described below, the chosen referent did not influence results.

Analysis Sample

A number of sample inclusion criteria were applied. As indicated above, we limited the analysis to adolescent females living in the nine countries (Austria, Finland, Greece, Hungary, Iceland, Lithuania, Romania, Spain and Ukraine) that asked questions about sexual behavior and parental support/knowledge (n=26,174 from 104,891 female participants in 2005/06 HBSC). Second, in HBSC, only participants in the 15-year-old group were asked about sexual behavior; therefore, only females in this age category were included (actual age range 14.6 – 16.5 years, n=8,495). Third, living with either their biological mother or biological father was an inclusion requirement (n=8,161) to make clear the parent reported in support and knowledge questions and because of considerable missing data when the parent referenced in support or knowledge questions was not co-residential. Finally, only students with complete covariate data were included, yielding two overlapping samples of adolescents who lived with their biological mother (n=7,210) and those who lived with their biological father (n=5,642). Level of missing data for analysis variables was 0% each for age and family structure; 1% for FAS and maternal support; 2% each for

maternal knowledge, paternal knowledge, and paternal support; and 6% for sexual initiation. Compared to those excluded for missing data, participants included in the complete case sample evidenced significantly greater family affluence (28% vs. 24% high affluence for co-residential mom, 31% vs. 25% high affluence for co-residential dad) but similar living arrangements and age.

Analysis

All analyses were conducted in Stata 10.1 with standard error corrections for clustering within classrooms and schools. Because one country (Spain) had a sample nearly twice the size of those in other countries, individual weights were constructed (specified as the country's target sample size divided by the country's actual sample size) to equalize sample sizes across countries. Analyses began with an examination of variable distributions (frequencies and means) in the overall sample of females; distributions were also statistically compared across countries using Chi-square and ANOVA analyses. In crude logistic regression models stratified on parent gender^c and country of residence, we examined the unadjusted relationship between parental support and adolescent females' early sexual initiation, and the relationship between parental knowledge and females' early sexual initiation. We also examined these variables' correlations with one another. In separate multivariable logistic models for each parent, we tested the relationship between parental support and early sexual initiation after controlling for age, family affluence, family structure and country fixed effects. Models were implemented in two steps. In the first step, we statistically tested between-country differences in the magnitude of the association between parental support and early initiation. All variables and interaction terms were entered simultaneously (Austria being the referent). Post-estimation Wald tests, with Bonferroni adjustments, were then conducted to estimate (1) the joint significance of all interaction terms (null hypothesis=no differences across all countries), and (2) the significance of every possible comparison between any country-pair (for each country-pair, null hypothesis=no difference between these two countries). In Stata, Bonferroni adjustments are made by multiplying each individual test's p-value by the total number of tests made.⁴⁷ Given that the initial set of interactions in the model only tests for country differences in comparison to Austria, the Wald test was necessary to determine which countries were significantly different from each other, and not only in relation to Austria. In our second step, we dropped all interaction terms due to the results of the Global Wald test, and thus were testing the relationship between support and early sexual initiation net of control variables. In the last part of our analyses, we added parental knowledge to the multivariable model. If the point estimate for parental support changed substantially after this addition (i.e., by 10% or more and became non-significant), we proceeded to utilize Sobel mediation tests to further probe the possible mediation relationship.^{48,49} Examination of correlation matrices and variance inflation factors indicated no problems with multicollinearity between independent variables.

RESULTS

Descriptive results

Respondents' average age was 15.6 years (Table 2). Almost 3 in 10 adolescent females reported high family affluence, and about 40% reported medium affluence. The majority (74%) of adolescent females reported living with both their biological parents. Almost one

^cPaternal and maternal variables were not modeled together for a number of reasons. Because of sample restrictions, we would need to limit to girls who are co-residential with both biological parents to model maternal and paternal variables together. This could result in sample selection biases. Recent research indicates there are variable patterns of associations for maternal versus paternal support with adolescent outcomes,¹⁴ therefore examining these constructs separately is appropriate.

in five females (19%) reported having experienced early sexual initiation. By definition, parental support and parental knowledge variables had an overall mean of zero (and standard deviation of one) across countries.

Bivariate results

Across all analysis variables, significant differences in prevalence or means were noted across countries (Table 2). Particularly noteworthy were substantial differences in family affluence (e.g., 69% high affluence in Iceland vs. 3% high affluence in Ukraine) and early sexual initiation (e.g., 7% prevalence in Romania versus 35% in Iceland). Average maternal support scores ranged from 0.3 standard deviations below the overall mean in Lithuania to 0.2 standard deviations above the overall mean in Hungary, Romania, and Ukraine. Mean paternal support scores ranged from 0.4 standard deviations below the overall mean in Lithuania to 0.2 standard deviations above the overall mean in Iceland and Romania. Differences in parental knowledge were also statistically significant. Maternal knowledge was lowest in the Ukraine (0.3 standard deviations below the overall mean) and highest in Hungary (0.3 standard deviations above the overall mean); paternal knowledge was lowest in Lithuania (0.5 standard deviations below the overall mean) and highest in Hungary (0.5 standard deviations above the overall mean).

In bivariate analyses, either support from mother or support from father was significantly negatively related to adolescent females' early sexual initiation (Table 3). Some variability across countries in the magnitude of associations was noted. For example, a one standard deviation increase in maternal support was associated with 34% lower odds of adolescent females' early sexual initiation in Lithuania, but unassociated with early sexual initiation in Greece and Hungary. Differences in associations by parent gender within countries were also apparent. Maternal support was more protective than paternal support against early sexual initiation in Austria, Spain and Ukraine, while paternal support was more protective than maternal support in Finland, Iceland, Lithuania, Greece, Hungary and Romania. However, a statistical test of differences between countries was non-significant.

Maternal and paternal knowledge were significantly negatively related to adolescent females' early sexual initiation in all countries (Table 3). These unadjusted associations appeared to vary in magnitude across countries as well. For example, a one standard deviation increase in paternal knowledge was associated with 55% lower odds of early sexual initiation in Greece, but only a 21% lower odds of early sexual initiation in Austria. However, a statistical test of differences between countries was non-significant.

Support and knowledge were also significantly and substantially associated with each other across countries for each parent (Table 4). Associations between variables were stronger for fathers than for mothers (correlation range 0.5-0.7 for fathers, 0.4-0.6 for mothers).

Multivariable results

Multivariable analyses of maternal variables began with models including control variables, support, country fixed effects, and interactions between country and parental support (Table 5, Model 1). Among adolescent females living with their mothers, the odds of early sexual initiation were greater with age (AOR=1.4) and with living apart from their biological father (Stepfamily AOR=2.1, Single Parent AOR=1.8), while affluence appeared to be unassociated with early sexual initiation (low affluence AOR=1.1, high affluence AOR=0.9). Statistical significance of country fixed effects indicated significant variability between Austria and some other countries in the prevalence of females' early sexual initiation, even after accounting for demographic characteristics and maternal support. For example, the adjusted odds of early sexual initiation was 52% lower in Greece versus

Austria net of control variables and maternal support. The point estimate for maternal support suggested that among girls living with their mothers in the referent country (Austria), greater perceived maternal support was associated with a lower odds of early sexual initiation (AOR=0.7). None of the country interactions with maternal support was statistically significant, suggesting the relationship between maternal support and early sexual initiation was similar between Austria and other included countries. A global Wald test of these interactions plus other country comparisons (available from authors on request) yielded no statistically significant differences, suggesting overall similar relationships between maternal support and early sexual initiation across all countries. Based on these findings, interaction terms were dropped in the second model; the single estimate for maternal support indicated that after controlling for individual and family characteristics, maternal support was significantly negatively related to adolescent females' early sexual initiation across countries (AOR=0.8). Similar relationships between early sexual initiation and control variables and country fixed effects were observed in model two compared to model one. In the third model, we added the maternal knowledge score. After this addition, the adjusted odds ratio for maternal support became weaker and statistically non-significant. Further, the association between maternal knowledge and adolescent females' early sexual initiation was significant and strong (AOR=0.7). A Sobel mediation test with values adjusted for the dichotomous outcome was consistent with mediation of the maternal support-early initiation relationship by maternal knowledge (Sobel statistic = -9.55, se=0.0014).

Similar conclusions were also supported for paternal support (Table 5). There were no statistically significant differences between countries in the association between paternal support and adolescent females' early sexual initiation (results from pairwise comparisons and Global Wald test available from authors on request). Across countries, paternal support was negatively associated with early sexual initiation after controlling for individual and family characteristics (AOR=0.7). However, after adding paternal knowledge, the association between paternal support and adolescent females' early sexual initiation became weaker and non-significant, while the association between paternal knowledge and adolescent females' early sexual initiation was significant and strong (AOR = 0.7). A Sobel test was consistent with paternal knowledge acting as a mediator of the relationship between paternal support and adolescent females' early initiation (Sobel statistic = -6.98, se=0.0039).

DISCUSSION

The first major finding in the present study was the significant variability across European countries in the sexual behavior of adolescent females. Both similarities and differences were observed within regions. Similar to past studies, the highest prevalence of early sexual initiation was found in Northern and Western European countries, although Lithuania (defined by the UN as a Northern European country) had a very low prevalence.⁵⁰ In multivariable models, significant between-country differences in odds of early sexual initiation persisted even after controlling for demographic factors such as family affluence and family living arrangements. Further research is warranted in cultural and structural reasons for these inter-country differences in early sexual initiation prevalence.

The second major finding was the consistency across countries in the negative relationship between parental support and adolescent females' early sexual initiation. This was unexpected, given earlier findings²⁰ and the variability in the prevalence of early sexual initiation across countries, which is suggestive of different norms and values. Discrepant findings between the previous study and the current analysis may arise from differences in countries examined, the previous study's use of a risky sexual behavior index versus our examination of early sexual initiation only, or differences between studies in variables

included in models (e.g., parental closeness was included in the earlier study but not current analysis). Our finding of a similar negative relationship between parental support and early initiation across countries may suggest that the commonness of a behavior is an imperfect indicator of parents' disapproval of adolescent females' sexual initiation before age 16, and that this disapproval is uniform across countries. Alternately, as suggested by attachment theory, parental support could act as a building block for interpersonal skills and subsequent healthy relationships with parents, peers and dating partners across cultural contexts.

The third major finding was that although we observed significant negative associations between maternal/paternal support and adolescent females' early sexual initiation, once parental knowledge level was added to models, these associations became nonsignificant. The significant Sobel test was consistent with a mediation relationship, wherein parental support produces greater parental knowledge of adolescent females' lives, which in turn decreases the likelihood of females' early initiation. The cross-sectional nature of the present data, however, warrants caution in interpretation of results. We were not able to discern the temporal ordering of parental support, parental knowledge, and early sexual initiation. An alternate interpretation of the results is that parental knowledge is a stronger correlate of later sexual initiation than parent support. The distinction between conclusions is important for public health practice. One suggests that parental support is an important strategy by which parents may gain knowledge of adolescent females' lives, and thus reduce early initiation risk. The other suggests that parental support is superfluous, and that parents should concentrate on gaining knowledge. Future research should directly assess the relative importance of perceived parental support, active parental surveillance and voluntary adolescent disclosure in European contexts within longitudinal designs that better facilitate identification of causal processes.

Our findings have significant implications for public health practice and prevention programming. First, findings could suggest that programs designed to delay females' sexual initiation would benefit from encouraging positive parenting practices such as offering support and gaining knowledge of adolescents' daily lives. Second, our finding that paternal, as well as maternal, positive parenting practices (support and knowledge) are negatively associated with adolescent females' early sexual initiation suggests that adolescent females, particularly those residing with their biological fathers, may benefit from the inclusion of both fathers and mothers in sexual risk behavior prevention programming.

This study advances our knowledge of the relationship between parent support and adolescent females' early sexual initiation by incorporating data from multiple countries utilizing a common questionnaire and population-based samples. However results should be interpreted with knowledge of the study's limitations. First, the study is cross-sectional and therefore causal inference, especially as related to mediation, should be made with caution. Studies conducted in the U.S. have confirmed that changes in relationships with parents both precede and follow adolescents' sexual initiation, such that worsening relationships with parents predict initiation, and subsequent to initiation, parental relationships worsen.⁵¹ Future studies utilizing longitudinal designs should be undertaken to confirm the present study's results. Second, we were unable to include a variable measuring parental sexual communication due to its absence from the HBSC survey. Although a general ease of communication question was asked, in prior work this measure has had no relationship to early sexual debut in European countries.⁴⁴ Future studies should build upon the present study by including a measure of parent-child sexual communication, given literature finding this construct to be an important protective factor in other settings.^{7,41} Third, although we hypothesized that perceived parental support could enhance the enactment of parental values against early initiation, we were unable to test this assumption given we had no direct measures of parental values in the present study. Future European studies with alternate data

sources may explore this proposition. Fourth, because we limit our sample to adolescent females who live with their biological mother or father or both, we cannot generalize results to adolescents who live apart from these parents. It could be that parental support is more important with a non-residential parent; future studies should investigate this possibility. Fifth, the item querying sexual initiation does not specify type of contact (i.e., vaginal, oral or anal), nor whether the experience was consensual, therefore participants responding to this question may have variable interpretations. Finally, by using a complete case analysis, we excluded about nine percent of our otherwise-eligible participants. Although this is a relatively small proportion excluded, included females evidenced some positive selection on family affluence which could bias the results of our study.

In conclusion, our findings underscore the cross-national importance of multiple facets of parenting for early sexual debut among adolescent females, regardless of multiple population differences. Although further study is warranted to examine the temporal ordering of parental support and knowledge, and the potential nuances of reciprocal processes in different cultural contexts, the sexual health of adolescent females may be enhanced by providers' encouragement of constructive parental practices that include providing support and gaining knowledge of their daughters' daily lives.

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Table 1

Background characteristics of included countries

	2001: Percent 15-year-old females reporting ever having sex ²⁹	2006: Country income group ³⁰	2006: Age of legal consent for heterosexual sex ^{31,32}	Birth rate among 15-19 year olds (per 1,000 population) ³³	Percent population saying religion is very important to them ³⁴
Northern Europe					
Finland	33.1%	High	16	8.6	14%
Iceland	(unavailable)	High	14	14.6	19%
Lithuania	10.8%	Upper Middle	14	19.0	14%
Western Europe					
Austria	19.1%	High	14	11.2	20%
Southern Europe					
Greece	9.6%	High	15	12.0	33%
Spain	14.8%	High	13	13.6	19%
Eastern Europe					
Hungary	16.4%	Upper Middle	14	20.1	20%
Romania	(unavailable)	Upper Middle	15	38.5	51%
Ukraine	24.0%	Lower Middle	16	29.3	22%

Table 2
Demographic characteristics, early sexual initiation, and parenting practices among adolescent females: Prevalence and means overall and by country^a

	TOTAL (n=7,466)									
	BY UN REGION & COUNTRY									
	North		West		South		East			
	Finland (n=830)	Iceland (n=867)	Lithuania (n=859)	Austria (n=744)	Greece (n=662)	Spain (n=1,229)	Hungary (n=552)	Romania (n=810)	Ukraine (n=913)	
Covariates										
Age (mean, SD) ^{***}	15.8 (0.30)	15.6 (0.28)	15.7 (0.35)	15.2 (0.29)	15.6 (0.26)	15.6 (0.42)	15.5 (0.25)	15.5 (0.33)	15.7 (0.35)	
Family affluence (%) ^{***}										
Low	13.4	2.1	39.7	14.7	30.1	15.0	37.1	50.5	63.8	
Medium	49.8	28.8	46.2	50.1	46.1	46.6	42.6	40.5	33.5	
High	36.9	69.1	14.1	35.2	23.9	38.4	20.3	9.0	2.7	
Living arrangement (%) ^{***}										
Two biological parents	70.0	72.7	69.7	73.8	85.1	85.7	72.6	64.6	68.7	
Stepfamily	14.0	12.3	10.6	8.7	1.7	3.5	9.4	3.6	9.3	
Single parent	16.1	15.0	19.7	17.5	13.3	10.8	17.9	31.9	22.0	
Outcome										
Early sexual initiation ^b (%) ^{***}	29.2	34.7	9.4	24.9	13.7	15.1	20.5	7.2	14.7	
Predictor										
Maternal support ^c ^{***} (mean, SD)	0.0 (1.0)	0.1 (1.0)	-0.3 (1.0)	0.0 (1.0)	-0.1 (0.9)	0.0 (1.3)	0.2 (0.8)	0.2 (0.9)	0.2 (0.9)	
Paternal support ^d ^{***} (mean, SD)	-0.1 (0.9)	0.2 (0.9)	-0.4 (1.1)	-0.1 (1.0)	-0.2 (0.9)	0.1 (1.3)	0.1 (0.7)	0.2 (1.0)	-0.1 (0.9)	
Mediators										
Maternal knowledge ^e ^{***} (mean, SD)	-0.2 (1.0)	0.1 (1.0)	-0.2 (1.0)	-0.2 (1.0)	0.2 (0.7)	0.2 (1.1)	0.3 (0.7)	0.1 (1.0)	-0.3 (1.1)	
Paternal knowledge ^f ^{***} (mean, SD)	-0.1 (0.9)	0.0 (1.0)	-0.5 (1.0)	-0.2 (1.0)	0.1 (0.8)	0.2 (1.2)	0.5 (0.7)	0.1 (1.0)	-0.2 (1.0)	

[†] p<0.10

* p<0.05

** p<0.01

*** p<0.001

Notes: European regions reported are based on UN definitions.

^a All analyses were weighted with standard error corrections. Means are presented with standard deviations. Percentages may not sum to 100% due to rounding. P-values are from chi-square or ANOVA test for differences between countries.

^b Early sexual initiation = before age 16.

^c Subpopulation of females living with their biological mother, n=7,210

^d Subpopulation of females living with their biological father, n=5,642

Table 3

Parental support, parental knowledge, and females' early sexual initiation

	OUTCOME: Early Sexual Initiation OR (95% CI)									
	North		West		South			East		
	Finland	Iceland	Lithuania	Austria	Greece	Spain	Hungary	Romania	Ukraine	
Maternal Support ^a	0.85* (0.71 – 0.98)	0.78*** (0.68 – 0.88)	0.66*** (0.52 – 0.80)	0.73*** (0.60 – 0.86)	1.02 (0.80 – 1.23)	0.74*** (0.63 – 0.85)	0.85 (0.65 – 1.04)	0.68* (0.47 – 0.90)	0.74*** (0.59 – 0.90)	
Maternal Knowledge ^a	0.73*** (0.62 – 0.84)	0.67*** (0.57 – 0.76)	0.73** (0.59 – 0.88)	0.73** (0.59 – 0.86)	0.59*** (0.44 – 0.75)	0.61*** (0.50 – 0.72)	0.63*** (0.50 – 0.78)	0.63*** (0.47 – 0.79)	0.63*** (0.53 – 0.73)	
Paternal Support ^b	0.74** (0.59 – 0.89)	0.72** (0.59 – 0.84)	0.62** (0.42 – 0.81)	0.74** (0.61 – 0.88)	0.70** (0.53 – 0.88)	0.81* (0.67 – 0.95)	0.70** (0.52 – 0.88)	0.66** (0.46 – 0.86)	0.81 (0.61 – 1.02)	
Paternal Knowledge ^b	0.65*** (0.52 – 0.78)	0.71*** (0.59 – 0.84)	0.57** (0.37 – 0.76)	0.79* (0.65 – 0.93)	0.45*** (0.34 – 0.57)	0.62*** (0.50 – 0.74)	0.65** (0.47 – 0.84)	0.67* (0.45 – 0.88)	0.63*** (0.46 – 0.80)	

† p<0.10

* p<0.05

** p<0.01

*** p<0.001

Notes: Bivariate results with separate models for each country. OR = Odds Ratio per standard deviation increase in support or knowledge; CI = Confidence Interval.

^a Subpopulation of females living with their biological mother, n=7,210^b Subpopulation of females living with their biological father, n=5,642

Table 4

Correlations between parent support and knowledge

	North		West		South		East		
	Finland	Iceland	Lithuania	Austria	Greece	Spain	Hungary	Romania	Ukraine
Maternal support & knowledge ^a	0.46***	0.48***	0.42***	0.57***	0.38***	0.47***	0.51***	0.50***	0.50***
Paternal support & knowledge ^b	0.50***	0.57***	0.60***	0.65***	0.56***	0.60***	0.54***	0.54***	0.57***

[†] p<0.10
 * p<0.05
 ** p<0.01
 *** p<0.001

^a Subpopulation of females living with their biological mother, n=7,210

^b Subpopulation of females living with their biological father, n=5,642

Table 5

Parental support and adolescent females' early sexual initiation: Multivariable results controlling for individual and family characteristics^a

	OUTCOME: Early Sexual Initiation Adjusted Odds Ratios					
	Maternal Models (n=7,210)			Paternal Models (n=5,642)		
	With Interactions ^b	No Interactions	Adding Knowledge	With Interactions ^c	No Interactions	Adding knowledge
Age	1.44 (1.17 – 1.78) **	1.44 (1.17 – 1.77) **	1.46 (1.18 – 1.80) **	1.46 (1.13 – 1.89) †	1.47 (1.13 – 1.89) *	1.47 (1.13 – 1.90) †
Family affluence						
Low	1.12 (0.93 – 1.34)	1.13 (0.94 – 1.35)	1.12 (0.93 – 1.34)	1.17 (0.95 – 1.43)	1.18 (0.96 – 1.45)	1.14 (0.92 – 1.40)
Medium	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
High	0.94 (0.80 – 1.09)	0.94 (0.81 – 1.10)	0.95 (0.81 – 1.11)	0.93 (0.77 – 1.11)	0.93 (0.78 – 1.11)	0.92 (0.76 – 1.10)
Living arrangement						
Two biological parents	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Stepfamily	2.13 (1.75 – 2.61) ***	2.14 (1.75 – 2.61) ***	2.15 (1.76 – 2.64) ***	3.18 (1.83 – 5.55) ***	3.21 (1.84 – 5.62) ***	3.68 (1.03 – 6.68) ***
Single parent	1.76 (1.48 – 2.11) ***	1.75 (1.47 – 2.09) ***	1.75 (1.46 – 2.09) ***	1.99 (1.32 – 3.00) *	1.99 (1.32 – 2.99) *	2.29 (1.52 – 3.45) **
Maternal support	0.72 (0.60 – 0.86) **	0.80 (0.75 – 0.85) ***	0.95 (0.88 – 1.02)	--	--	--
Maternal knowledge	--	--	0.69 (0.65 – 0.75) ***	--	--	--
Paternal support	--	--	--	0.75 (0.63 – 0.90) *	0.74 (0.68 – 0.79) ***	0.90 (0.82 – 1.00)
Paternal knowledge	--	--	--	--	--	0.69 (0.62 – 0.76) ***
Country fixed effects						
Austria	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Finland	0.97 (0.71 – 1.33)	0.94 (0.70 – 1.27)	0.95 (0.71 – 1.28)	0.86 (0.60 – 1.21)	0.86 (0.61 – 1.19)	0.90 (0.64 – 1.26)
Greece	0.47 (0.32 – 0.68) ***	0.44 (0.31 – 0.64) ***	0.52 (0.36 – 0.75) **	0.40 (0.27 – 0.59) ***	0.40 (0.28 – 0.59) ***	0.47 (0.32 – 0.69) **
Hungary	0.71 (0.51 – 1.00)	0.71 (0.50 – 0.99)	0.82 (0.58 – 1.15)	0.75 (0.52 – 1.10)	0.75 (0.52 – 1.09)	0.97 (0.66 – 1.42)
Iceland	1.50 (1.10 – 2.04)	1.48 (1.09 – 2.00) *	1.60 (1.18 – 2.16) *	1.75 (1.25 – 2.45) *	1.76 (1.26 – 2.44) *	1.82 (1.31 – 2.54) **
Lithuania	0.21 (0.14 – 0.32) ***	0.23 (0.16 – 0.33) ***	0.24 (0.17 – 0.34) ***	0.18 (0.11 – 0.30) ***	0.20 (0.13 – 0.31) ***	0.20 (0.13 – 0.30) ***
Romania	0.18 (0.12 – 0.27) ***	0.18 (0.13 – 0.26) ***	0.19 (0.13 – 0.28) ***	0.18 (0.12 – 0.29) ***	0.19 (0.12 – 0.29) ***	0.20 (0.13 – 0.31) ***
Spain	0.52 (0.38 – 0.72) **	0.52 (0.38 – 0.71) ***	0.61 (0.44 – 0.83) *	0.50 (0.36 – 0.70) ***	0.50 (0.36 – 0.69) ***	0.57 (0.41 – 0.80) *
Ukraine	0.42 (0.29 – 0.60) ***	0.41 (0.29 – 0.58) ***	0.38 (0.27 – 0.54) ***	0.33 (0.23 – 0.49) ***	0.33 (0.23 – 0.49) ***	0.32 (0.22 – 0.47) ***

	OUTCOME: Early Sexual Initiation Adjusted Odds Ratios							
	Maternal Models (n=7,210)				Paternal Models (n=5,642)			
	With Interactions ^b	No Interactions	Adding Knowledge	With Interactions ^c	No Interactions	Adding Knowledge	With Interactions ^c	Adding Knowledge
Interactions	Ref.	--	--	Ref.	--	--	--	--
Austria* support	1.17 (0.92 – 1.48)	--	--	0.99 (0.76 – 1.30)	--	--	--	--
Finland* support	1.43 (1.09 – 1.88)	--	--	0.94 (0.70 – 1.27)	--	--	--	--
Greece* support	1.21 (0.91 – 1.61)	--	--	0.96 (0.70 – 1.32)	--	--	--	--
Hungary* support	1.11 (0.89 – 1.40)	--	--	0.97 (0.75 – 1.25)	--	--	--	--
Iceland* support	0.95 (0.72 – 1.25)	--	--	0.84 (0.58 – 1.22)	--	--	--	--
Lithuania* support	0.97 (0.68 – 1.39)	--	--	0.89 (0.62 – 1.27)	--	--	--	--
Romania* support	1.05 (0.83 – 1.33)	--	--	1.09 (0.84 – 1.40)	--	--	--	--
Spain* support	1.07 (0.81 – 1.41)	--	--	1.06 (0.77 – 1.45)	--	--	--	--
Ukraine* support								

^f p<0.10

* p<0.05

** p<0.01

*** p<0.001

^a All reported p-values are Bonferroni –adjusted.

^b Global Wald test of all pairwise comparisons p=0.144

^c Global Wald test of all pairwise comparisons p=0.942