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Cervical cancer screening, pelvic examinations, and contraceptive use among adolescent and young adult females

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Abstract

Purpose—To characterize the association between pelvic examination and adolescent contraceptive method use in two time periods in the 2006–2010 National Survey of Family Growth (NSFG).

Methods—Using data from the 2006–2010 NSFG, we used descriptive statistics and multivariable regression models to examine the association between pelvic examination and/or Pap smear, and use of effective or highly effective contraceptive methods during 2 time periods. (2006–2008 and 2008–2010). We used the design characteristics of the NSFG to produce population estimates.

Results—More than half (57.3%) of our target population reported that they had a pelvic examination and/or Pap smear in the preceding 12 months. After considering health service use, pregnancy history and demographic characteristics, receipt of pelvic/Pap remained significantly associated with use of effective or highly effective methods of contraception. (aOR= 1.86, 95% CI; 1.17, 2.97). When we examined the relationship between pelvic/Pap and use of effective or highly effective methods within time periods, we found that the odds of effective contraception use was higher among adolescents who had received a Pap/pelvic exam in period 1 (June 2006–

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May 2008) but not in period 2 (June 2008–May 2010). (OR=3.05, 95% CI;1.53, 6.03 and OR=1.52, 95% CI; 0.88, 2.62, periods 1 and 2 respectively.)

Conclusion—This finding provides some reassurance that while indications for pelvic examination and Pap smear among adolescents have decreased, the previously documented association between pelvic examination and effective or highly effective contraception appears to have decreased.

Keywords

Adolescents; contraception; pelvic examination

Indications for conducting pelvic examinations among adolescents have decreased considerably over the past decade. Perhaps one of the most important reasons underlying this decline is changes to cervical cancer screening guidelines delaying screening until age 21 regardless of sexual activity.[1–3] (In 2002 guidelines changed from routine screening starting at 18 years of age to starting 3 years following onset of sexual intercourse. Subsequent guidelines (2008), delayed screening until age 21 regardless of sexual activity.) Furthermore, although still required by many physicians [4], guidelines and experts have discouraged providers from requiring screening speculum or bimanual examinations in asymptomatic adolescents for over a decade, as this requirement creates unnecessary barriers.[5–7] Practice changes in response to these newer guidelines, as well as the increased availability of urine-based assays for sexually transmitted infection screening, should result in fewer screening pelvic examinations among adolescents. Indeed, between 2000 and 2010, the proportion of 18–21 year olds reporting they had been screened for cervical cancer decreased from 74% to 53%.[8] Similar data on rates of pelvic examinations for other indications are not available. Whether and how individual physician practice changes will impact the delivery of other reproductive health services, such as contraceptive method provision, to adolescents is unclear.

There has been some concern that reducing screening pelvic exams, with or without Pap smears, may have unintended consequences on the delivery of other recommended reproductive health services, including contraception provision and sexually transmitted infection screening,[9] though there are little data to support this claim. One study of sexually active adolescents aged 15–20 found that those who underwent cervical cancer screening in 2007 were significantly more likely to have chlamydia screening than those who did not undergo cervical cancer screening (43.6% compared with 9.5%), despite the fact that over 90% of participants had a reproductive health visit during the observation period.[10]

While understudied, there are plausible reasons that declining encounters for screening pelvic examinations might impact the delivery of other recommended reproductive health services. For instance, some adolescents might be motivated to seek reproductive health services due to a belief that they need an “annual pelvic” exam. Without a concurrent strategy to enable and encourage adolescents to obtain other annually recommended services (e.g. screening for sexually transmitted infection (STI) screening or contraceptive services), informing them that they no longer need yearly pelvic examinations could result in a

reduction or delay in the delivery of these other services. Adolescents in particular may be vulnerable to these changes because they are already infrequent users of preventive health services.[11] Furthermore, adolescents might be less inclined to use specialized women's health providers if they do not need a pelvic examination resulting in fewer visits to providers most likely to provide comprehensive contraceptive services and STI screening. [12, 13]

Our objective was to determine whether the relationship between pelvic examinations and contraception method use among female adolescents had changed following the release of guidelines (2009)[1, 3] and recommendations that should decrease the frequency of screening pelvic examinations in this population. To accomplish this objective, we characterized the association between pelvic examination and contraceptive method use within two time periods in the 2006–2010 National Survey of Family Growth (NSFG).

Methods

Data

This project received exempt status from the University of Michigan Institutional Review Board. We used 2006–2010 NSFG data, a continuous, nationally representative survey of reproductive health behaviors and outcomes administered by the National Center for Health Statistics. This population-based survey collects data on family life, pregnancy, use of contraception, and women's health.[14] Responses were collected via in-person household interviews from 12,279 non-institutionalized women aged 15–44. Blacks and Hispanics were oversampled. Respondents were assigned a survey weight based on age, race and ethnicity, and accounting for unequal probabilities of selection into the NSFG sample, allowing estimates to be representative of the U.S. population of women aged 15–44 years old. The response rate for 2006–2010 (AAPOR RR4) was 78%. Further information about the methodology used can be found at: http://www.cdc.gov/nchs/data/nsfg/NSFG_2006-2010_UserGuide_MainText.pdf.

We focused our analysis on the subpopulation of post-menarchal adolescent (15–20 years old) female participants at risk for an unintended pregnancy. We defined “at risk” as ever having had sexual intercourse with a male partner, not currently or attempting to become pregnant, and not surgically sterile. Our analytic subsample consisted of 1,208 adolescent females, but the entire sample was processed for variance estimation purposes.[15]

Our main exposure was defined as receipt of either a pelvic examination and/or a Pap smear in the past 12 months. We initially planned to examine the receipt of pelvic examination and receipt of Pap smear distinctly; however, during exploratory analysis, we suspected that respondents may not accurately distinguish between these two services. Since neither a screening pelvic examination or Pap smear is required in this age group, we combined these services and defined our main exposure as the receipt of either a pelvic examination OR pap smear in the past 12 months (yes/no). (Subsequently we refer to this measure as “pelvic/Pap”). Participants were characterized as exposed if they answered “yes” to either or both of the following questions: “In the past 12 months, have you received a Pap smear?” and “In the past 12 months, have you received a pelvic exam?”

Our primary outcome of interest was the current use of an effective or highly effective method of contraception. Initially, we grouped contraceptive methods into four major categories: highly effective methods (tubal ligations, intrauterine contraception, implants), effective methods (contraceptive pills, Depo-Provera, patches, ring), other methods (barrier methods, withdrawal, periodic abstinence), and no method. Respondents who reported using more than one contraceptive method were categorized based on the most effective method reported. We conducted exploratory analysis using this categorical variable. Since the use of “highly effective” methods was uncommon (<4%), we used current use of effective or highly effective methods (yes/no) as our outcome in the final models.

Statistical Analysis

First, we analyzed the association between receipt of pelvic/Pap and effective contraceptive use among the entire sample of adolescents from 2006–2010. We used design-based descriptive and bivariate analyses (unweighted frequencies, weighted estimation of means and proportions; design-adjusted Rao-Scott chi-square tests and t-tests) to describe demographic, social, reproductive history, and health service use characteristics among all individuals in the target population and by pelvic/Pap status.

Next, we used logistic regression to estimate the relationship of receiving pelvic/Pap with the odds of using effective or highly effective contraception while controlling for relevant covariates. Variables were included in the multivariate model if their p-values in bivariate analyses were 0.25 or less.[16] We expected that exposure to health services generally (not just reproductive health services) might be associated with both our exposure (pelvic/Pap) and our outcome (effective or highly effective contraception use), therefore, we conducted a sub-analysis of adolescents that reported ever using any medical service since menarche. This variable was coded as “yes” if the participant answered “yes” to any service in the past 12-months or to an item asking if they have ever used any kind of medical service since menarche. To determine whether the relationship between pelvic/Pap and contraceptive use changed over the survey years, we initially included survey year in our first set of models. Finally, because we hypothesized that the magnitude of the association between pelvic/Pap and contraception use should decrease over time if new clinical guidelines are adopted, we examined the relationship between pelvic/Pap and effective or highly effective contraceptive method use in two time periods: June 2006–May 2008 (period 1) and June 2008–May 2010 (period 2). In all analysis, we used the NSFG survey weights to account for the complex, stratified sampling design of NSFG. Linearized standard errors accounting for the complex sampling features were computed using the SURVEYMEANS, SURVEYFREQ, and SURVEYLOGISTIC procedures in SAS 9.2.

Results

We identified 1,208 female respondents between 15 and 20 years of age at risk for an unintended pregnancy. More than half (57.3%) of our target population reported that they had a pelvic examination and/or Pap smear in the preceding 12 months. Estimated characteristics of the target population are shown in Table 1. Age correlated significantly with the receipt of a pelvic/Pap; older adolescents (17–18 years, 19–20 years) had higher

proportions of having received a pelvic/Pap in the past year than younger adolescents ($p<0.0001$). Race and socioeconomic status were not associated with receipt of pelvic/Pap. A larger proportion of adolescents who had received a pelvic/Pap in the past 12 months were using effective or highly effective methods of contraception than those who had not received pelvic/Pap. (56.9% versus 25.4% respectively, $p<0.0001$)

There were 565 and 643 respondents interviewed in periods 1 and periods 2 respectively. Table 2 shows contraception use patterns and health service utilization among our target population by study period. The proportion of adolescents reporting using effective or highly effective methods of contraception was higher in period 2 than period 1. Other measures of health service use did not differ significantly by study period.

Results of the multivariable logistic regression analyses are shown in Tables 3 and 4. Receipt of pelvic/Pap in the past 12 months was associated with use of effective or highly effective contraception in the whole study population, as well as in a subpopulation of adolescents reporting at least one health service visit since menarche. (Table 3) After controlling for health service use, pregnancy history, and demographic characteristics, receipt of pelvic/Pap remained significantly associated with use of effective or highly effective methods of contraception. (aOR= 1.86, 95% CI; 1.17, 2.97) When we examined the relationship between pelvic/Pap and use of effective or highly effective methods within periods 1 and 2, we found that the odds of effective contraception use was higher among adolescents who had received a Pap/pelvic exam in period 1 but effective contraception use was not related to pelvic/Pap in period 2. (OR=3.05, 95% CI; 1.53, 6.03, and OR=1.52, 95% CI; 0.88, 2.62, respectively.) (Table 4)

Discussion

During period 1 (June 2006 – May 2008), the odds of using an effective or highly effective birth control method among sexually active female adolescents were three times higher among those who reported having a pelvic examination with or without a pap smear as compared to those who did not. However, it appears that this association may have weakened. In the latter years of our observation period, use of effective contraception was no longer associated with the receipt of a pelvic examination. Although early, this finding provides some reassurance that reducing screening pelvic examinations among adolescents may not negatively impact use of effective contraception. It is possible, however, that early adopters of guidelines related to screening pelvic examinations might be more likely to address contraception use with their adolescent patients; therefore continued monitoring is warranted.

After observing important increases in contraception use and declines in adolescent pregnancy rates in the U.S. prior to 2002, contraception use stabilized between 2002 and 2010.[17] Among our sample, we found no differences in use of counseling, screening for sexually transmitted infections or pelvic examinations with or without pap smear across later years in the last decade. However, reproductive health service use among adolescents remains exceedingly low, especially among sub-groups such as socially disadvantaged adolescents.[11, 18] This observation partially explains contraception non-use and reliance

on less effective methods by some adolescents. While this was not a focus of this study, it is important to note that efforts to improve use of effective contraception must address low reproductive health service use among adolescents at risk for unintended pregnancy. One strategy should include routine assessment of pregnancy risk and need for contraception at all encounters with adolescents.

This study has several limitations. The main limitation is that we cannot distinguish between screening exams and exams for other indications, such as screening for sexually transmitted diseases, but we do not expect this to differ between periods. We also recognize that because NSFG uses in-home interviews, adolescents might be reluctant to report sensitive information such as contraception use; however, we have no reason to believe this bias would have differed between time periods or exposure groups. Because we examined relatively short time intervals among a relatively small number of adolescents per survey year, we may not have been able to observe changes that may be occurring over longer periods of time. Moreover, survey items may not reliably distinguish between cervical cancer screening and routine pelvic examinations; therefore we did not examine these services separately. It is also possible that the pelvic examination and contraception provision were done by different providers. Lastly, small sample sizes limited our ability to examine the relationship between pelvic examination and/or Pap smears and contraceptive method use among various sub-populations.

Undoubtedly, reducing unnecessary pelvic examinations and cervical cancer screening encounters are important to prevent well-documented consequent harms and expenses resulting from overtreatment or unnecessary tests.[1, 3] Furthermore, requiring reflexive pelvic examinations prior to contraceptive method provision creates unnecessary barriers, particularly for adolescents, and may discourage use of the best methods. Although our findings on the apparent decreasing link between pelvic exams and receipt of effective contraception are reassuring, it seems plausible that as clinical practice continues to change around the screening pelvic examination, consequent changes in utilization of reproductive health services among adolescents, both in frequency and in source of services, warrant continued monitoring, particularly as they may shape reproductive outcomes.

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Implications and Contribution

Indications for conducting pelvic examinations among adolescents have decreased considerably and there is some concern that consequent changes in health service utilization may negatively impact contraceptive method provision. Between 2006 and 2010, the positive association between pelvic examinations and contraception use decreased; during the latter half of the study period there was no association between pelvic examination and use of effective contraception. Although early, these findings are reassuring.

Table 1

Sociodemographic characteristics of study population by pelvic/Pap in past 12 months National Survey of Family Growth, 2006–2010.

	Pelvic/Pap in the Past 12 Months		P-Value
	Yes (n=746) n (%) [*]	No (n=462) n (%) [*]	
Mean age (mean years $\pm$ STD error)	18.6 $\pm$ 0.06	17.8 $\pm$ 0.1	
Age			< 0.0001
15–16	66 (7.15)	107 (22.9)	
17–18	253 (32.6)	190 (38.8)	
19–20	427 (60.2)	165 (38.33)	
Race/Ethnicity			0.05
Non-Hispanic White	369 (58.5)	235 (58.0)	
Non-Hispanic Black	195 (11.8)	78 (12.7)	
Non-Hispanic Other	27 (3.4)	33 (8.3)	
Hispanic	155 (10.2)	116 (21.0)	
Number of Pregnancies			< 0.0001
0	473 (67.4)	396 (87.7)	
1	177 (21.5)	45 (7.9)	
2	74 (0.8)	18 (4.1)	
3 or More	22 (2.4)	3 (0.1)	
Mother's Educational Attainment ^{**}			0.2
Less than high school	143 (16.4)	110 (23.1)	
High school graduate or GED	247 (30.0)	130 (26.8)	
Some college, including 2 year degree	232 (32.8)	137 (31.3)	
Bachelor's degree or higher	119 (20.7)	85 (18.7)	
Current Health Insurance Status			< 0.01
Private health insurance or Medi-Gap	359 (54.8)	220 (52.1)	
Medicaid, CHIP, or a state-sponsored health plan	243 (26.7)	117 (22.8)	
Medicare, military health care, or other government health care	39 (4.7)	16 (2.6)	
Single-service plan, only by the HIS, or currently not covered by health insurance	105 (13.7)	106 (22.4)	
Current Contraceptive Method			< 0.0001
Highly-Effective	31 (3.7)	10 (2.6)	
Effective	376 (53.2)	103 (22.8)	
Other	152 (17.7)	137 (31.3)	
None	186 (25.2)	211 (43.3)	
Counseling for, or been tested or treated for a sexually transmitted disease	363 (45.5)	59 (11.7)	< 0.0001

* Data are presented as unweighted frequencies and weighted proportions

** Five women reported no mother figure in their life.

Table 2

Reproductive health service use by period in the past 12 months *

	Period		P-Value
	Period 1 (n=565) n (%)	Period 2 (n=643) n (%)	
Current Contraceptive Method			< 0.01
Highly-Effective	12 (0.9)	29 (4.7)	
Effective	215 (37.5)	264 (46.3)	
Other	143 (23.1)	147 (22.9)	
None	195 (38.5)	203 (26.1)	
Ever used health services since menarche, n (%)	456 (79.2)	511 (80.9)	NS
Reproductive health service use past 12 months, n (%)	313 (53.3)	354 (50.0)	NS
Received the following services in past 12 months			
A method of birth control or prescription for a method	318 (55.6)	382 (62.4)	NS
A check-up or medical test related to using a birth control method	213 (37.7)	258 (42.7)	NS
Counseling or information about birth control	191 (32.6)	218 (32.4)	NS
Counseling or information about emergency contraception	76 (11.7)	67 (7.2)	NS
Counseling for, or been tested or treated for a sexually transmitted disease	203 (13.7)	219 (15.2)	NS

* Data are presented as unweighted frequencies and weighted proportions

Table 3

Adolescent use of effective or highly-effective contraception method and receipt of pelvic/Pap in past 12 months.

	Unadjusted Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)**
All participants		
Receipt of a pelvic/Pap in the past 12 months	3.89 (2.56, 5.92)	1.86 (1.16, 2.98)
Age		1.09 (0.67, 1.23)
Race/Ethnicity		
Non-Hispanic White		1.00 Referent
Non-Hispanic Black		0.34 (0.24, 0.49)
Non-Hispanic Other		0.37 (0.17, 0.80)
Hispanic		0.69 (0.41, 1.18)
Maternal Education		
Less than high school		0.84 (0.54, 1.31)
High school graduate or GED		1.00 Referent
Some college		1.33 (0.88, 1.99)
Bachelor's degree or higher		1.23 (0.67, 2.24)
Previously Pregnant		
Yes		1.09 (0.99, 1.20)
No		1.00 Referent
Ever used health services since menarche		
Yes		37.7 (7.94, 178.77)
No		1.00 Referent
Health service users *		
Receipt of a pelvic/Pap in the past 12 months	1.77 (1.16, 2.70)	1.86 (1.17, 2.97)
Age		1.11 (0.97, 1.23)
Race/Ethnicity		
Non-Hispanic White		1.00 Referent
Non-Hispanic Black		0.34 (0.23, 0.48)
Non-Hispanic Other		0.38 (0.17, 0.82)
Hispanic		0.71 (0.41, 1.21)
Maternal Education		
Less than high school		0.82 (0.53, 1.30)
High school graduate or GED		1.00 Referent
Some college		1.26 (0.84, 1.91)
Bachelor's degree or higher		1.23 (0.66, 2.27)
Previously Pregnant		
Yes		1.06 (0.96, 1.18)
No		1.00 Referent

* Defined as respondents that reported ever seeing a provider or receiving birth control or other medical services since menarche.

** Adjusted for age, race, maternal education, pregnancy history, health service use.

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Table 4

Adolescent use of effective or highly-effective contraception method and receipt of pelvic/Pap in past 12 months by period.

	Period 1 Adjusted OR (95%CI)	Period 2 Adjusted OR (95%CI)
Receipt of a pelvic/Pap in the past 12 months	3.05 (1.53, 6.03)	1.52 (0.88, 2.62)
Age	1.09 (0.93, 1.28)	1.05 (0.86, 1.27)
Race/Ethnicity		
Non-Hispanic White	1.00 Referent	1.00 Referent
Non-Hispanic Black	0.34 (0.19, 0.59)	0.32 (0.19, 0.56)
Non-Hispanic Other	0.24 (0.08, 0.76)	0.59 (0.26, 1.33)
Hispanic	0.40 (0.18, 0.88)	1.19 (0.62, 2.31)
Maternal Education		
Less than high school	1.26 (0.68, 2.34)	0.50 (0.25, 1.01)
High school graduate or GED	1.00 Referent	1.00 Referent
Some college	1.28 (0.71, 2.32)	1.21 (0.68, 2.16)
Bachelor's degree or higher	1.15 (0.98, 1.31)	1.29 (0.50, 3.32)
Previously Pregnant		
Yes	1.14 (0.98, 1.31)	1.04 (0.92, 1.19)
No	1.00 Referent	1.00 Referent