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Original article

A Comparison of Childbirth Costs for Adolescents and Adults From 2001 to 2010

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A B S T R A C T

Purpose: Although teenage birth rates in America have fallen to a historic low of 26.2 births per 1,000 teenagers, the U.S. remains behind the rest of the industrialized world. Adolescent pregnancy is relatively well discussed in today's literature, with ever more detailed estimates constantly emerging to quantify the cost of children born to America's teenagers. This study, however, describes the financial cost of childbirth in the U.S. with a specific focus on understanding the impact of adolescent childbirth in comparison to that of adult women and of annual childbirth as a whole.

Methods: This retrospective cohort study used data from the 2001–2010 Healthcare Cost and Utilization Project-Nationwide Inpatient Sample (HCUP-NIS), a uniform, multistate database containing information regarding approximately 8 million hospital inpatient stays per year of data. Data were analyzed involving payment type, length of stay, and aggregate cost of all childbirths to adolescent girls (under 18 years of age) and to adult women.

Results: This study found that Medicaid pays for the majority (70%) of births to adolescent girls, whereas private insurance pays for the majority (53%) of births to adult women. This was in contrast to the Medicaid coverage of 41% of all childbirths within the study time frame. Furthermore, the aggregate cost of childbirths to adolescent girls paid for by Medicaid was $670 million.

Conclusions: Beyond their social impact, births to adolescent mothers place a financial burden on the national economy. Stronger efforts must be made to decrease adolescent childbirth.

IMPLICATIONS AND CONTRIBUTIONS

This study indicates that adolescent pregnancies continue to place a large financial burden on public funding in the U.S. The analysis compares the costs of adolescent deliveries and suggests policies that may effectively reduce unwanted adolescent pregnancy. Improving adolescent access to family planning resources may in turn reduce public spending on adolescent deliveries.

Although teenage birth rates in the U.S. have fallen to a historic low of 26.2 births per 1,000 teenagers [1], the U.S. remains behind the rest of the industrialized world [2]. Despite signs of the U.S. beginning to narrow the gap with countries such as Australia, the United Kingdom, and Russia—whose teen birth rates are comparatively high for industrialized countries but still far outstrip the U.S.—adolescent pregnancy still costs the U.S. billions of dollars. Women of reproductive age are eligible for pregnancy-related care under the publicly funded Medicaid program [3]. Thus, the financial responsibility of many adolescent pregnancies falls on taxpayers and impacts the economy of the country as a whole.

Adolescent pregnancy is relatively well discussed in today's literature, with ever more detailed estimates constantly emerging to quantify the cost of children born to U.S. teenagers. These calculations frequently highlight dollars spent from prenatal care and onward until into late childhood, taking into account factors

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such as loss of the mother's economic productivity and social welfare programs for families. In this way, it is estimated that children born to teenagers in the U.S. will cost taxpayers approximately $13 million throughout their lifetime [4]. Although these figures of lifetime cost are certainly important for seeing the overall impact of adolescent pregnancy, estimating them involves a level of predicting the life path of a child at the time of birth (i.e., jail time, welfare dependence, and medical needs). The specific costs during pregnancy and childbirth are, on the other hand, significantly more objective in portraying the cost of adolescent reproduction. Unfortunately, we were unable to find any studies that describe such costs when it comes to teenage deliveries or show the trends of these costs. As such, the present study solely describes the cost of childbirth in the U.S. from 2001 to 2010 with a specific focus on understanding the impact of adolescent childbirth in comparison to that of adult women and of annual childbirth as a whole. In addition to examining the costs of adolescent deliveries, we also offer suggestions to expand access to contraception and family planning resources to reduce the overall incidence of adolescent pregnancies and thus reduce the cost of adolescent deliveries.

Methods

After obtaining exemption from the University of Texas, Medical Branch, in the Galveston Institutional Review Board, we performed a retrospective cohort study using data from the 2001–2010 Healthcare Cost and Utilization Project-Nationwide Inpatient Sample (HCUP-NIS). This is a uniform, multistate database containing information regarding approximately 8 million hospital inpatient stays per year of data. Using a stratified, random sampling design, the Nationwide Inpatient Sample (NIS) approximates a 20% sample of community hospitals in the U.S. These samples are from 46 states, giving a representation of approximately 97% of the U.S. population. The data represent approximately 20% of admissions to U.S. hospitals. Diagnostic and procedural codes are classified according to the *International Classification of Diseases*, Ninth Revision, Clinical Modification.

HCUP is based on data from community hospitals, defined as short-term, nonfederal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). Healthcare Cost and Utilization Project (HCUP) data were used from 2001 to 2010, including 7,400,767 hospital discharges.

Total hospital charges were converted to costs using HCUP cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services. Costs tend to reflect the actual costs of production, whereas charges represent what the hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP states. Hospital charges reflect the amount the hospital charged for the entire hospital stay and do not include professional (physician) fees. For the purposes of the present study, costs are reported to the nearest hundreds. A hospital stay in the HCUP data can be coded with up to two payment sources if more than one payer was involved in covering the cost of stay. When this occurs, the following hierarchy is used: if either payment type is listed as Medicaid, the payment type is "Medicaid." For non-Medicaid stays, if either payment type is listed as Medicare, the payment type is "Medicare." For stays that are neither Medicaid nor Medicare, if either payment type is listed as private insurance, the payment type is "private insurance." For stays that are not Medicaid, Medicare, or private insurance, if either payment type is some other third-party payment type, the payment type is "other," which consists of Worker's Compensation, Civilian Health and Medical Program of the Uniformed Services, Civilian Health and Medical Program of the Department of Veterans Affairs, Title V, and other government programs. For stays that have no third-party payment type and the payment type is listed as "self-pay" or "no charge," the payment type is "uninsured."

Inclusion criteria were women with a primary discharge diagnosis of cesarean section with/without complications and comorbidities (CCs) or major complications and comorbidities (MCCs) and vaginal delivery with/without sterilization, with/without dilation and curettage (D&C), or complicating diagnoses as classified by the *International Classification of Diseases*, Ninth Revision, codes. These codes were as follows: 765 for cesarean section with CC/MCC, 766 for cesarean section without CC/MCC, 767 for vaginal delivery with sterilization and/or D&C, 768 for vaginal delivery with operating room procedure except sterilization and/or D&C, 774 vaginal delivery with complicating diagnoses, or 775 for vaginal delivery without complicating diagnoses. After 2007, the codes have been changed from 370 to 765, from 371 to 766, from 372 to 767, from 373 to 768, from 374 to 774, and from 375 to 775.

With regard to statistical analysis, cost of delivery is compared between adolescent girls (under 18 years of age) and adult women by using two independent samples *t*-test. This test is used to compare the means of a normally distributed interval dependent variable for two independent groups. Although the *t*-test assumes that the means of the different samples are normally distributed, it does not assume a normal distribution of samples. With a large number of variables, the means of samples from a population with a finite variance approach a normal distribution regardless of the distribution of the population [5].

Results

Between 2001 and 2010, $15.7 billion (52%) of all childbirth hospitalizations were paid for by private insurance, $12.2 billion (41%) were paid by Medicaid, and $724 million (4%) were paid by other providers. In terms of adolescent childbirth costs in particular, only $222 million (23%) were paid for by private insurance and $700 million (70%) were paid for by Medicaid. In contrast, $15.5 billion (53%) of childbirth costs for nonadolescent women were paid for by private insurance and $11.5 billion (40%) were paid for by Medicaid. Figure 1 represents these data visually in pie chart form.

We further compared the outlying years, 2001 and 2010, to see the overall trends of the study time frame. In 2001 and in 2010, Medicaid coverage increased from $708 million (35.6%) to $1.5 billion (45.6%) of all annual childbirths, respectively. In contrast, private insurance coverage decreased from $1.2 billion (58.6%) to $1.6 billion (47.6%), respectively.

From 2001 to 2010 as a whole, adolescent childbirths represent 5.74% of all childbirth-related hospitalizations covered by Medicaid, with an aggregate cost of $670 million paid by the provider. In private insurance, on the other hand, adolescent childbirths represent 1.52% of hospitalizations, with an aggregate cost of $222 million for the providers. These data are represented in Table 1.

In 2001, 3.81% of childbirths were to adolescent mothers. By 2010, this had dropped steadily to 3.09% births to adolescent mothers.