National Health Care & Adolescent Sexual Activity:
The Role of Economic Decision Making

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Abstract

This study seeks to explore a possible correlation between the relative healthcare expenditures of government and private entities with adolescents’ decisions to use safe sexual practices. Analyses show that greater government expenditure results in increased contraceptive use and decreased adolescent fertility rate. Increased private spending also results in a slightly greater rate of contraceptive use, but an increased adolescent fertility rate. In addition, a policy of mandatory insurance coverage has the greatest ability to decrease adolescent fertility rate. Results show slight support for the theory of economic decision making and cost-benefit analysis in which teens use safer sexual practices when the cost of doing so is low, especially because of easy accessibility, a condition which may prevail when the national government contributes significantly to healthcare. However, government contributions to healthcare may most usefully be an indicator of a government’s willingness to invest in its citizens as a whole, leading to healthier decision making in all aspects of life, including sexual activity.
Introduction

When it comes to teens’ decisions regarding sexual activity, there seems to be endless speculation about what influences an adolescent to initiate sexual activity, and further, whether or not to do so in a safe manner. Many previous studies have looked to local and individual issues such as neighborhood characteristics, family income, employment rates, and educational attainment with these studies seeming to point to the idea that teens adopt safer sexual practices when the consequences of unsafe sexual activity represent a greater loss to their wellbeing. However, more universal conditions which may have a comparable effect on all of a nation’s citizens are rarely analyzed for applicability within this paradigm despite the valuable knowledge which may be gained by policy makers through studies such as these. One topic which may be of particular interest to policy makers today is government-supported health care and the possible effects that it may have on teens’ decisions about sexual activity, especially with the United States in the midst of a bitter political debate about the merits of public versus private health care plans in addition to a history of higher than average teen births. In the context of this controversy, adding one more layer to the benefits and consequences of a public health care plan may be an invaluable activity.

Literature Review

Adolescent Sexual Activity

For all people, sexual activity can have very serious consequences, including pregnancy and the contraction of a sexually transmitted disease (STD) or infection (STI), but for adolescents, these consequences may be especially grave with the immense financial burden at a time when they are financially dependent in addition to the long-term and ongoing ramifications of an ill-timed pregnancy or health concern. One way in which adolescents may completely eliminate the possibility of these negative consequences is to abstain from sexual activity but for those who choose to participate in sexual activity, the use of contraceptives greatly decreases the chances of negative outcomes. Unsurprisingly, research has found that in populations which have a low rate of contraceptive use, there is an increase in rates of STD occurrence, HIV/AIDS infections, and abortions (Bentley & Kavanagh 2008). Contraceptives come in many forms including prescription methods such as birth control pills, diaphragms, injectables, implants, and intrauterine devices; over-the-counter methods such as condoms or spermicidal foam, jelly, or cream; and behavioral methods such as rhythm or withdrawal. While each of these methods is intended to prevent pregnancy, some, such as condoms, can also prevent the spread of an STD or STI (Culwell & Feinglass
Access to these reproductive services is often gained through doctor visits—as in the case of prescription methods—direct purchase, or through family planning clinics. Family planning clinics most often offer oral contraceptives, injectables, and condoms, and in some cases, the contraceptive patch or vaginal ring (Lindberg, L. D., Frost, J. J., Sten, C. & Dailard, C. 2006).

Despite the great benefits provided by contraceptives, adolescent rates of use can still remain quite low. One reason for this is that access to contraceptives may be restricted, either by concerns about confidentiality or by cost. As expected, females who experience greater barriers to accessing contraceptives were much less likely to have ever received them (Ford 2010), thereby also reducing likelihood of use. Family planning clinics can mitigate some of these obstacles by providing reproductive health services at reduced or no cost and also by doing so without requiring parental involvement (Lindberg et al. 2006). Several studies have shown that areas which have a greater presence of family planning clinics also have higher rates of contraceptive use among adolescent girls (Averett, Rees & Argys 2002; Moore, Morrison & Glel 1995).

Limited access to doctors can also have a negative effect on access to contraceptives. Because some of the most effective methods of contraception are received by prescription only, access to these methods is lost if doctors and health care are not easily and affordably available. In the U.S., prescription methods are used significantly more by insured women than uninsured, while uninsured women are more likely to use over-the-counter methods or none at all (Culwell & Feinglass 2007).

In addition to contraceptive use, adolescent fertility rate is another measure which is often used to evaluate adolescent sexual behavior. Because fertility rates are a measure of the rate at which children are born within a certain population, it is not a direct measure of adolescent sexual activity but instead of a sequence of events that starts with sexual activity: first the occurrence of sexual activity, second a failure to use contraceptive, or at the very least failure to use an effective method of contraceptive, and finally the completion of a pregnancy that was not terminated or ended in miscarriage.

Group-level predictors of adolescent sexual activity

As could be expected, adolescent sexual behavior is not only affected by individual values but is also very susceptible to external forces most often determined by socioeconomic status, including family income, employment opportunities, and education. In fact, the significant effects of these factors have been observed time and time again by many researchers. Teens whose families report a higher income have a decreased likelihood of
STD contraction (Singh, Darroch, Frost & Study Team 2001; Ford 2010) and of pregnancy (Singh et al. 2001; Ford 2010; Levine 2001; Ku, Sonenstein & Pleck 2003). Adolescent girls from high income families are also more likely to use contraceptives (Averett, Rees & Argys 2002; Levine 2001), although males from wealthier families are not (Ku et al. 2003). Taking part in sexual activity similarly differed between high income males and females with greater income levels leading to decreased likelihood of sexual activity in females (Averett, Rees & Argys 2002) but increased levels in males (Ku et al. 2003).

Employment can have a significant effect on adolescent sexual activity as well. High unemployment rates tend to lead to increased teen births (Singh et al. 2001; Moore et al. 1995; Ku et al. 1993) but have a divergent effect on adolescent males’ and females’ use of contraceptives. For females, being employed is associated with increased use of contraceptives (Culwell & Feinglass 2007; Levine 2001) but no clear effect on contraceptive use has been identified in young males according to employment status (Levine 2001; Ku et al. 1993). Depending on the nature of the study, both less frequent sexual activity (Levine 2001) and also greater numbers of sexual partners (Ku et al. 1993) have been shown in employed males.

The effects of higher education are also notable. In France, level of educational attainment was insignificant in determining contraceptive use at first intercourse but in the U.S. and Great Britain, lower levels of education were associated with lower use of contraceptives (Singh et al. 2001). Similarly, American adolescents whose parents had greater levels of education were more likely to use contraceptives (Moore et al. 1995). In addition, greater educational attainment appears to lead to an increase in the age at which sexual activity is initiated (Singh et al. 2001; Levine 2001).

An Economic Decision Making Model

The findings of these various studies seem to point to an economic model of decision making, or rational choice. An economic model not only assumes that individuals make choices which result in the lowest cost to themselves but also that these individuals are rational. In order to make a decision, individuals must consider the costs (both financial and in opportunities lost) and benefits of each possible option. Further, due to the rationality of individuals, it is also assumed that when conducting cost-benefit analysis the decision-maker will take into account both immediate and long-term consequences in their consideration (Levine 2001).

For example, teens who feel that they are able to earn a lucrative income, either because of a history of high income within the family, a favorable employment marketplace, or a high level of education, may choose to either
delay initiation of sexual activity or to be more vigilant about the use of contraceptives because a pregnancy or a sexually contracted illness would be more costly if it were to interfere with their ability to earn that income. In contrast, teens who see little opportunity for employment or for a financially stable life may be less concerned about avoiding pregnancy or STDs because they feel that the increased financial burden of these outcomes will make little difference in their inability to provide a comfortable life for themselves. In summary, when teens feel that the potential costs of sexual activity, such as getting an STD or becoming pregnant, are greater than its potential benefits of immediate satisfaction, they are less likely to take part in risky sexual behavior. One study found this to be true, with an increased perception of costs such as contraction of AIDS or the loss of employment opportunities leading to decreased likelihood of sexual activity among teens and an increased use of contraceptives among those who were sexually active (Ahituv, Hotz & Philipson 1996). The application of this model of decision making can also be seen in Baumeister and Mendoza’s international study of sexual permissiveness according to gender inequality norms (2011) and Matthews, Ribar, and Wilhelm’s study of birthrates according to access to reproductive health services (1997).

However, the rational choice model assumes that individuals make decisions based on rationality at all times, an easily debatable assumption when it comes to teens’ choices regarding sexual activity. To compensate for this shortcoming, further models have been developed which posit that increased ability to make rational decisions comes with increased age, suggesting that in earlier adolescence, sexual encounters tend to be more irrational and spontaneous. This does not discount the ability of adolescents to make rational decisions completely but rather acknowledges the fact that at a younger age instantaneous rewards are often more highly valued than the long-term benefits of delaying gratification. Because of discrepancies according to age in ability to consider long-term consequences, decisions made as a teen may in fact appear irrational when reviewed later despite the perception of rational choice by the teen at the time of the decision (Levine 2001).

Because of this tendency for adolescents to focus more on short term costs and benefits rather than long term consequences, it may be that the immediate effort which is required to make safe sexual decisions is more influential in adolescents’ decision making processes than concerns about events which may or may not happen in the future as a result of unsafe sexual activity –things such as pregnancy or sexually contracted disease. In this case, the ease of obtaining contraceptives may be the greatest predictor of adolescents’ decisions to use them or not, rather than a fear of pregnancy or illness which drives them to seek contraceptives out.
Further, teens’ actual ability to make informed decisions about sexual health can be greatly influenced by socioeconomic standing. Teens from families with a high level of income and education will not only be more able to afford contraceptives, but will also likely have a more thorough knowledge of safe sexual practices due to greater educational opportunities, both formal and informal, so that they can more fully understand the risks of each choice and also how to utilize resources that are available. In contrast, teens who grow up in a lower income environment or who have fewer educational opportunities may feel that contraceptives are too costly or may simply not have a comprehensive enough understanding of sexual health to value safe sexual practices.

Structural level predictors of adolescent sexual activity

Although the economic decision making model is mostly geared towards the effects of group characteristics which can vary greatly among individuals, it can also apply to decisions which are affected by more universal conditions which may be constant among all members of a population. An example of this is cultural values of gender equality, a characteristic which has consistently been shown to have an impact on sexual behavior. Higher levels of gender equality in a nation have been linked to more permissive attitudes towards sex including more casual sex, more partners, a younger age at which sexual activity is initiated and less emphasis on abstinence for young people (Baumeister & Mendoza 2011). In addition, increased gender equality is associated with increased use of contraceptives as women gain a greater sense of empowerment to negotiate their use (Blanch & Wolff 2001; Bentley & Kavanagh 2008). However, this positive correlation of gender equality to contraceptive use is much weaker in developed countries than in developing countries, perhaps because the effects of higher education overshadow the effects of gender equality (Bentley & Kavanagh 2008). In the case of a high level of gender equality, women who feel that they are capable of providing for themselves may be more likely to view sex as distinct from its reproductive purposes and therefore be more interested in minimizing the risk of pregnancy or disease in order to reduce the chances that their independence may be compromised, once again demonstrating the use of cost-benefit analysis in sexual decision making.

Another more widespread condition within a nation or region which may affect adolescent sexual activity is the method through which health care is provided, and therefore the level of access to health care which is available. Although rarely considered, health care institutions are undeniably intertwined with the consequences of sexual activity whether it is through access to certain contraceptives, information on sex and family planning, treatment of an STD or STI, physician care throughout a pregnancy, or even through abortion. All of this care may be essentially
inaccessible unless an individual is insured or a nation guarantees health care access to its citizens. This is especially true in countries such as the United States where the high cost of health care makes it unaffordable unless an individual has quality insurance coverage or an extremely high level of income (Culwell & Feinglass 2007; Jonk, Thiede Call, Cutting, O’Connor, Bansiya, & Harrison 2005; Nyman 1999).

Previous research has shown that contraceptive access and use is greatly affected by health care plans. In countries with national health care systems such as Sweden, France, Canada, and Great Britain, adolescents’ access to contraceptives was greater than in the United States (Singh et al. 2001) where there is no universal health insurance plan and insured adolescents did not receive contraceptives any more frequently than uninsured adolescents, perhaps because contraceptives are not covered by all insurance companies (Ford 2010). Health insurance coverage also has an especially large impact on the use of prescription contraceptives, which are available only after visiting a doctor and receiving a prescription (Culwell & Feinglass 2007).

As discussed earlier, the ease of immediate access to contraceptives may be most influential to teens’ decision making process with their tendency to value instantaneous rewards over long term costs and benefits. With health care coverage, especially government-supported mandatory coverage, access to contraceptives may be greatly increased, as lower health care costs directly mean that doctor’s visits and prescriptions are more affordable. However, family planning clinics or other outlets for low cost contraceptive access may also be more plentiful in an environment of low health care costs, not to mention the likely greater availability of sites which provide abortions. All of these provisions reduce the time and effort which would be required by adolescents to obtain contraceptives or end pregnancy and may therefore make completion of that task that much more likely.

Another effect on sexual health of having health insurance is the increased likelihood of having ever been tested or treated for an STD. Testing and treatment for STDs is shown to be significantly higher among female adolescents who had received a routine physical examination within the past year—in fact, receiving a physical was the strongest predictor of having received STD testing or treatment (Fiscus, Ford & Miller 2004). However, in order for a routine physical to occur, the teen must have adequate access to doctors, a condition which is mediated by the affordability of a doctor visit.

Effects of accessible health care on socioeconomic conditions

Further, various health insurance systems show significant correlations with many socioeconomic factors which have already been shown to influence sexual activity. For example, a strong negative correlation is found
between the amount of social spending by a country—including spending on national health care—and poverty levels, although it is possible that countries with lower poverty rates are simply more likely to spend their money on social programs (Pestieau 2006). In addition, in countries with accessible health care, citizens are more likely to be in good health, which may open the way for them to be able to pursue higher levels of education and skills (Mantzavinis, Tirkalinos, Dimoliatis & Ioannidis 2006), another variable which influences adolescents’ sexual decisions. For those countries which have social health care systems (including the whole of Europe), the defining feature is that insurance is mandatory and access is universal so that no one is left unable to get necessary care (Pestieau 2006), unlike in the United States’ privately funded system where access is hugely unequal (Comanor, Frech III & Miller 2006).

Research Question

With the great potential of health care access to affect the cost of consequences of teen sexual activity, this study seeks to determine if varying levels of access to health care has an effect on teens’ sexual decision making, as understood within the framework of economic decision making.

Methods

Sample

Data was collected from the World Health Organization’s Global Health Observatory Data Repository, the United Nations’ Millennium Development Goals Indicators, the World Economic Forum’s Global Gender Gap Report and the Organization for Economic Co-Operation and Development’s working paper “Health Systems Institutional Characteristics.” The WHO Global Health Observatory includes information compiled from over 50 datasets, including the UN Millennium Development Goals and the WHO’s own collection of health-related data. The UN data on Millennium Development Goals Indicators is collected from each country and compiled by the United Nations but is limited by the collection and reporting capacities of each nation. Both the WHO and UN data may contain estimates based on available data when necessary data is not produced. The World Economic Forum’s data is also collected from various sources and then converted into ratios while the OECD data was compiled from surveys completed by its member countries.

The range of years of data collection varied with each variable but almost all data originated between the years of 2000 and 2009, with some being earlier, beginning in 1991. The most recent data value available was
utilized in this study. A total of 193 countries which were consistently represented in the original datasets were part of the sample, but due to missing values not every nation is included in every analysis. The missing values present a potential bias in the data as some indicators were widely unreported within a group of countries which may fit a certain profile—for example, literacy rates were highly unreported by developed western European nations while youth unemployment rates were largely unreported in developing nations, especially in Africa. In the analyses, missing data in various measures left only 59 nations as a part of the final regression for contraceptive prevalence and only 76 nations were included in the regression regarding adolescent fertility rate.

**Measurement**

Information on all variables, their sources, median values, and the number of countries which provided data for each measure can be found in the following table on the following page.

*Measures of Adolescent Sexual Activity*

The two dependent variables in this study are contraceptive prevalence and adolescent fertility rate. While the measure of contraceptive prevalence which is used includes all women aged 15–49 and does not exclusively address the rates of use in young people, it correlates significantly with the rate of contraceptive use among women aged 15-19 (Pearson correlation of 0.821) and due to the large number of countries which do not report the statistic for younger citizens (132 of the 193 countries were missing data for this variable), the contraceptive prevalence rate among all women of reproductive age is a suitable stand-in measure of contraceptive use among 15-19 year olds. Similarly, the adolescent fertility rate does not indicate the exact topic of interest—which is the decisions that are made by young people in regards to their sexual health such as whether or not to have sex, use contraceptives, or terminate a pregnancy—but it is an easily observable consequence of these decisions and due to the limitations of cross-national data collection and inconsistency in measurement, one of the most accessible.

*Measurement of Group-Level Factors Affecting Adolescent Sexual Activity*

Based on previous research, the following variables were included in the experimental model to measure the effects of group-level factors: percentage of a nation’s population which is undernourished as a measure of poverty, the unemployment rate of young people aged 15-24 as a measure of the chances that a young person is employed, and the literacy rate of the same age group as a reflection of typical educational attainment. However, it must be noted that a value of 5 in the category of “Population undernourished” does not mean that 5% of the
Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Explanation</th>
<th>Source</th>
<th>Median Value</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contraceptive prevalence</td>
<td>percentage of women aged 15-49 who use at least one method of contraceptive, utilized either by themselves or by their sexual partners</td>
<td>WHO (2000-2009)</td>
<td>46.3</td>
<td>140</td>
</tr>
<tr>
<td>Adolescent fertility rate</td>
<td>annual number of births per 1,000 women aged 15-19</td>
<td>WHO (2003-2008)</td>
<td>44.0</td>
<td>185</td>
</tr>
</tbody>
</table>

Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Explanation</th>
<th>Source</th>
<th>Median Value</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population undernourished</td>
<td>percentage of the population who consumes less food than the minimum required for dietary energy</td>
<td>UN (2007)</td>
<td>6.0</td>
<td>170</td>
</tr>
<tr>
<td>Unemployment rate of young people aged 15-24 years, both sexes</td>
<td>proportion of the labor force aged 15-24 that is unemployed, available to work, and actively seeking work</td>
<td>UN (2000-2009)</td>
<td>17.8</td>
<td>117</td>
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<tr>
<td>Literacy rate</td>
<td>percentage of 15-24 year olds who can read and write a simple statement with understanding</td>
<td>UN (1991-2009)</td>
<td>97.4</td>
<td>144</td>
</tr>
<tr>
<td>Gender Equality</td>
<td>Measure of national gender gaps on economic, political, education- and health based criteria. Range of 0-1; a 1 indicates equality</td>
<td>World Economic Forum (2009)</td>
<td>0.684</td>
<td>132</td>
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<tr>
<td>Per capita government expenditure on health</td>
<td>average amount of money spent by the national government on each person, expressed in international dollars</td>
<td>WHO (2009)</td>
<td>267.0</td>
<td>191</td>
</tr>
<tr>
<td>Private expenditure on health as a percentage of total expenditure on health</td>
<td>percentage of all health spending which is provided by private entities, including voluntary health insurance, direct payment by corporation and by households</td>
<td>WHO (2009)</td>
<td>27.4</td>
<td>191</td>
</tr>
<tr>
<td>Private prepaid plans as a percentage of private expenditure on health</td>
<td>percentage of total health expenditure by private entities which is paid for voluntary health insurance</td>
<td>WHO (2009)</td>
<td>3.5</td>
<td>191</td>
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<tr>
<td>Type of national insurance system</td>
<td>national policy, if any, in place for the provision or requirement of health insurance</td>
<td>OECD (2009)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

population is undernourished. Due to reporting methods in the original UN dataset, a value of 5 signifies only that less than 5% of the population suffers from undernourishment.

Measurement of Group-Level Factors Affecting Adolescent Sexual Activity

Based on previous research, the following variables were included in the experimental model to measure the effects of group-level factors: percentage of a nation’s population which is undernourished as a measure of poverty, the unemployment rate of young people aged 15-24 as a measure of the chances that a young person is employed, and the literacy rate of the same age group as a reflection of typical educational attainment. However, it must be noted that a value of 5 in the category of “Population undernourished” does not mean that 5% of the
population is undernourished. Due to reporting methods in the original UN dataset, a value of 5 signifies only that less than 5% of the population suffers from undernourishment.

**Measurement of Structural-Level Factors Affecting Adolescent Sexual Activity**

As in previous studies of structural factors which influence adolescent sexual activity, a measure of each nation’s culture of gender equality is included in the analysis. In this study, this condition is represented with a gender gap index, a scale in which a value of 0 indicates complete inequality and a value of 1 indicates complete equality between men and women on a national level.

In order to analyze the effects of health care access on adolescent sexual activity, the following variables are included: per capita government expenditure on health, private expenditure on health as a percentage of total expenditure on health, and private prepaid plans as a percentage of private expenditure on health. While these three variables do not specifically measure health care access, they do indicate access as it is mediated by personal costs and due to the limitations of cross-national data analysis, these three variables were the best available and were therefore utilized. Per capita government expenditure on health care is expressed in an imaginary currency called international dollars. An international dollar has the same purchasing power (purchasing power parity or “ppp”) as a U.S. dollar has in the United States and is calculated using the ppp exchange rates (Exchange rates and a more extensive explanation of international dollars can be found at http://www.who.int/choice/costs/ppp/en/).

For further analysis, a dummy variable was created in order to specifically analyze the effects of a mandatory healthcare system versus one in which healthcare is not assumed. In these analyses, a nation is coded a 1 if insurance is mandatory, non-mandatory national systems are coded as 2 and countries whose exact insurance systems are unknown are coded as 3. Nations which require health insurance coverage, either through automatic tax-financed programs or through a variety of systems which work together to cover all citizens, and which were included in the analysis are Austria, Australia, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, and the United Kingdom. Countries included in the analysis as non-mandatory systems are Mexico, the United States, and Turkey and the remainder of the countries in the sample were coded as unknown. This list is limited to the member countries of the OECD plus the United States, which was included due to personal knowledge of the country’s system. It should be noted that
the countries which are listed as having mandatory systems are also among the richest in the world, a potential highly influential bias of the analysis.

Hypotheses

Using information from previous research and based on the variables which are available for the study of the effects of health care access on adolescent sexual activity, the following hypotheses were formulated: An increase in the per capita government expenditure on health care will lead to an increase in contraceptive use due to an increase in accessibility and a decreased adolescent fertility rate. Increased private expenditure on health care will result in a decreased rate of use of contraceptives because of more restricted access and an increased adolescent fertility rate due to greater obstacles to obtaining both contraceptives and abortions. An increase in the percentage of private health expenditure which is spent on prepaid plans could have several different outcomes. A greater expenditure on prepaid plans may lead to an increase in contraceptive use because it may be indicative of a greater regard for maintenance of personal health and may also increase the level of ease in obtaining contraceptives. However, contraceptive use may be unaffected if contraceptives are not covered by the prepaid plan or even decrease if knowledge of the presence of insurance coverage leads to less concern about future financial costs which may result from unsafe sexual activity. Similarly the adolescent fertility rate may decrease with greater expenditure on private prepaid plans if a willingness to pay for insurance coverage indicates a greater concern for personal health or it may increase if the costs of future health care are not seen as threatening due to the coverage of a health insurance plan.

Analysis

Data was analyzed using the IBM SPSS program. All indicators included in the multiple regressions were preliminarily evaluated for viability as variables according to completeness of the data and each indicator’s ability to reveal new information which was not essentially repeated by a second variable as indicated by correlations. Variables deemed non-useful by this evaluation were excluded from further data analysis. The remaining variables were used in running multiple linear regressions in order to model the relative weight of each demographic and health care cost variable in determining adolescent fertility rate and the prevalence of contraceptive use. Two models were created in order to analyze both the relative and comprehensive effects of the variables on contraceptive prevalence and the adolescent fertility rate. Model 1 includes only variables which have been previously studied by other researchers while Model 2 includes both previously studied variables and those which
are unique to this analysis, specifically variables reflecting the cost of health care to an individual. By comparing the two models, the collective influence of the health care system variables can be analyzed as compared to the influence of those factors which have already been studied.

Finally, in order to more specifically analyze the effects of a mandatory national insurance system, the mean values of contraceptive use and adolescent fertility rates were compared among countries which require insurance coverage, those which do not, and those whose exact policy is unknown.

Results

Contraceptive Prevalence

Table 1 shows the relative impact of each variable on the rate at which contraception is used, analyzed with both Model 1 and Model 2. Model 1, which includes only the previously studied indicators of poverty as indicated by percentage of the population undernourished, unemployment, education, and gender equality accounts for 43.3% of the variance in contraceptive prevalence (R Square=0.433), with literacy rate being the only statistically significant predictor at the .01 level. At the 0.05 level, only unemployment is additionally statistically significant.

After including indicators of health care costs and access, Model 2 accounts for 44.8% of the variance in contraceptive prevalence rates (R square= 0.448), an increase of only 1.5% from Model 1. An increase that small may likely be attributed solely to the addition of new variables to the model and not necessarily to the variables’ ability to contribute usefully. In this model, only literacy rates are significant at the 0.01 level and at the 0.05 level, the youth unemployment rate, per capita government health expenditure, and the percentage of private expenditure spent on prepaid plans are additionally significant.

Without regards to statistical significance, contraceptive use increases with literacy rates and with greater equality and decreases as poverty and unemployment levels go up, all relationships which have been observed in previous studies. As for health care access variables, contraceptive use increased with all types of health care spending – government expenditure, private expenditure, and private expenditure on prepaid plans. The relationship of increased contraceptive use with increased government spending confirmed the hypothesis, but the hypothesis regarding private expenditure was not supported. Rather than contraceptive use decreasing with greater private expenditure, there was actually a slight, albeit statistically insignificant, increase in contraceptive use. Finally, contraceptive use increased with an increase in prepaid plan expenditure.
Table 1

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model 1</th>
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<th>Model 2</th>
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<td></td>
<td>Standardized B</td>
<td>Unstandardized B</td>
<td>Sig.</td>
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<td>Unstandardized B</td>
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<td>Base</td>
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<tr>
<td>Population undernourished (%)</td>
<td>-0.081</td>
<td>-0.165</td>
<td>0.512</td>
<td>-0.062</td>
<td>-0.128</td>
<td>0.627</td>
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<td>Unemployment rate of young people, 15-24, both sexes</td>
<td>-0.268</td>
<td>-0.419</td>
<td>0.020</td>
<td>-0.305</td>
<td>-0.478</td>
<td>0.013</td>
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<td>Literacy rate of 15-24 year olds, both sexes (%)</td>
<td>0.655</td>
<td>1.020</td>
<td>0.000</td>
<td>0.650</td>
<td>1.012</td>
<td>0.000</td>
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<td>Gender equality</td>
<td>0.038</td>
<td>14.723</td>
<td>0.750</td>
<td>0.011</td>
<td>4.371</td>
<td>0.930</td>
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<td>Health Care</td>
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<td>Per capita government expenditure on health</td>
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<td>Private expenditure on health as a percentage of total expenditure on health</td>
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<td>Private prepaid plans as a percentage of private expenditure on health</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>R Square</td>
<td>0.433</td>
<td></td>
<td></td>
<td>0.448</td>
<td></td>
<td></td>
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<tr>
<td>Sample Size</td>
<td>59</td>
<td></td>
<td></td>
<td>59</td>
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</tr>
</tbody>
</table>
Unfortunately, because of the many missing values among the different variables, the usefulness of the model is limited by the small sample size, only 59 of the 193 which are included in the database, and results must be interpreted carefully with this in mind.

**Adolescent Fertility Rate**

Table 2 presents the relative importance of each variable in determining the adolescent fertility rate of a nation, again using Models 1 and 2, which are structured in the same way as in the analysis of rates of contraceptive use. For this second indicator of adolescent sexual activity, Model 1, including only the four previously studied variables of poverty –employment opportunities, education, and gender equality, -accounts for 46.8% of the variance in the adolescent fertility rate. In Model 1, both the percentage of the population which is undernourished and the literacy rate are significant at the 0.01 level in predicting the adolescent fertility rate. At the 0.05 level, the level of gender equality is also significant.

Model 2, with its inclusion of health care access variables, accounts for 55.4% of the variance in the adolescent fertility rate, an increase of 8.6% in its ability to predict adolescent fertility rate as compared to Model 1. In Model 2, once again only literacy rates are statistically significant at the 0.01 level but at the 0.05 level, all variables except the percentage of health care expenditure which is provided by private entities is significant.

The results of this analysis follow, for the most part, the expectations of previous studies. Adolescent fertility rates decrease as poverty decreases and education increases. However, according to this data, the adolescent fertility rate actually increases with greater employment and with greater levels of gender equality, two outcomes which were not expected according to previous research.

When it comes to health care access variables, fertility rates decreased as government expenditure increased (standardized B= -0.262), as was predicted by the hypotheses. It slightly increased with private expenditure (standardized B= 0.030) as predicted, although this is not a significant relationship, and increased more greatly with expenditure on private prepaid plans (standardized B=0.176). Again, unfortunately sample size is a concern, with only 76 nations included in this analysis out of the 193 which were included in the complete database.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model 1</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Standardized B</td>
<td>Unstandardized B</td>
<td>Sig.</td>
<td>Standardized B</td>
<td>Unstandardized B</td>
<td>Sig.</td>
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</tr>
<tr>
<td><strong>Base</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Population undernourished (%)</td>
<td>0.307</td>
<td>1.266</td>
<td>0.005</td>
<td>0.218</td>
<td>0.897</td>
<td>0.036</td>
<td></td>
</tr>
<tr>
<td>Unemployment rate of young people, 15-24, both sexes</td>
<td>-0.159</td>
<td>-0.503</td>
<td>0.090</td>
<td>-0.200</td>
<td>-0.634</td>
<td>0.026</td>
<td></td>
</tr>
<tr>
<td>Literacy rate of 15-24 year olds, both sexes (%)</td>
<td>-0.442</td>
<td>-1.424</td>
<td>0.000</td>
<td>-0.404</td>
<td>-1.300</td>
<td>0.001</td>
<td></td>
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<tr>
<td>Gender equality</td>
<td>0.215</td>
<td>165.324</td>
<td>0.035</td>
<td>0.221</td>
<td>169.956</td>
<td>0.027</td>
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</tr>
<tr>
<td><strong>Health Care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percapita government expenditure on health</td>
<td></td>
<td></td>
<td></td>
<td>-0.262</td>
<td>-0.015</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td>Private expenditure on health as a percentage of total expenditure on health</td>
<td></td>
<td></td>
<td></td>
<td>0.030</td>
<td>0.062</td>
<td>0.765</td>
<td></td>
</tr>
<tr>
<td>Private prepaid plans as a percentage of private expenditure on health</td>
<td></td>
<td></td>
<td></td>
<td>0.176</td>
<td>0.408</td>
<td>0.041</td>
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<tr>
<td>R Square</td>
<td>0.468</td>
<td></td>
<td></td>
<td>0.554</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sample Size</td>
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<td></td>
<td>76</td>
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</tbody>
</table>
Effects of Mandatory Health Insurance

Table 3 compares the mean rates of contraceptive use and the adolescent fertility rate among countries which require health insurance for all citizens, those which do not require health insurance, and those whose exact system is unknown. The type of insurance system seems to have little impact on the rate at which contraceptives are used as there is only a slight difference in mean values between countries with mandatory health insurance and those which do not require coverage. However, both of these values are significantly higher than the mean rate of contraceptive use among those nations whose system type is unknown. This large gap may be due in part to the relative wealth of the countries in each category, with those whose system type is known (both mandatory and non-mandatory) possessing much more wealth than those countries whose system type is unknown (for list of countries included in the classifications, see Measurement of Structural-Level Factors Affecting Adolescent Sexual Activity subheading in Methods section). In addition, the results must be interpreted with caution because of the small number of countries whose insurance systems could be confidently categorized.

Unlike the rates of contraceptive use, the adolescent fertility rate does appear to be greatly affected by the type of insurance coverage system in a country. Among nations with mandatory health insurance, the mean adolescent fertility rate is 12.29, as compared to countries without required insurance where the mean adolescent fertility rate is 62.33, a difference of over 40 babies per year per 1,000 young women born to adolescents. This large decrease supports the hypothesis that greater government contribution to health care leads to a lower adolescent fertility rate. Interestingly, the adolescent fertility rate of those countries without mandatory insurance coverage closely resembles that of countries whose system type is unknown, with a mean rate of 63.50 babies born to teens each year. Once again, the small sample size of categorized countries must be acknowledged and therefore the results interpreted cautiously despite the great gap which appears between the different groups.

Summary

The analyses of this study found support for the hypothesis that greater government expenditure leads to an increase in the rate at which contraceptives are used as well as a decreased adolescent fertility rate in keeping with
ideas of economic decision making. Greater private expenditure on health care did not lead to a decrease in contraceptive use as expected, but rather a slight increase, as well as a slight, but insignificant increase in the adolescent fertility rate. Although there was not a clear directional hypothesis for the effects of increasing expenditure on private prepaid plans, the analysis shows that the rate of contraceptive use increases as well as the adolescent fertility rate, the same results as were found for private expenditure in general. The strongest relationship occurred, however, when countries were divided by the type of insurance coverage policy which is in use. The adolescent fertility rate dropped dramatically with mandatory coverage despite the fact that contraceptive use showed only a very slight increase in mandatory insurance systems over non-mandatory policies.

Conclusions

Government expenditure on health care

As predicted, a greater amount of government expenditure on health care resulted in an increased rate of contraceptive use and a decreased adolescent fertility rate. Interestingly, the increase in contraceptive use was much smaller than the decrease in the fertility rate, which suggests that perhaps adolescent sexual activity as a whole is less in countries with greater government health care expenditure or possibly that more abortions are being performed in these countries. Greater government involvement in health care is likely the cause of greater access to abortions and also contraceptives, which in a cost-benefit analysis by teens, makes the chances of the use of those resources much more probable due to the lower effort required to obtain them. Two ways to increase the accessibility of these resources are to offer them at an affordable price and also in a location which is easily accessible, for example a family planning clinic or a doctor’s office which does not require much bureaucracy and advance planning.

In addition, it is likely that the same country which contributes more generously to health care resources will also make greater investments into other institutions such as education and employment which have potential to affect poverty rates. Both previous studies and this study have found that improving all three of these conditions has a positive correlation with contraceptive use and a negative correlation with adolescent fertility rate. This relationship suggests that perhaps a government’s willingness to contribute to healthcare is most usefully an indicator of its willingness to make investments in its citizens as a whole, a contribution which seems to result in more careful and healthy decisions by the citizens.
Private expenditure on health care

The results of the analysis did not show support for the hypothesis that a greater proportion of health care expenditure by private entities would lead to lowered rate of contraceptive use and a greater adolescent fertility rate but instead showed a statistically insignificant increase in both contraceptive use and the adolescent fertility rate. This indicates that a greater burden on private entities does not necessarily make the immediate costs of safe sexual activity dramatically greater either by making access to contraceptives or abortion more difficult nor does it make future medical costs which may result from unsafe sexual activity sufficiently high to promote safer practices at a high rate. Interesting is that the increase in contraceptive use coincides with an increase in the fertility rate, although neither of these relationships was significant in the analysis. This may indicate that the methods which are being used by people who have a greater personal health care cost burden are those which are less effective, suggesting that the more effective prescription methods may be less common in countries with a greater reliance on private health care financing.

Expenditure on private prepaid plans

Although a clear hypothesis was not determined for the effects of greater prepaid plan expenditure on the sexual decisions of adolescents, the data analysis was able to provide some direction. A greater percentage of health care expenditure devoted to prepaid plans led to a small increase in contraceptive use and a slightly larger increase in the adolescent fertility rate, once again a seemingly incongruous coincidence, perhaps caused by the use of less effective methods of contraception. Nevertheless, the increase in contraceptive use may suggest that people whose families are willing to pay for a prepaid plan are also more likely to be concerned about their health and therefore make the investment of using contraceptives. It may also indicate that contraceptives actually are more accessible when a person has already paid a greater amount for a prepaid plan. Or, similar to the amount of spending by government, it could be an indicator of the money which the same people are able to invest in other things such as basic necessities and education which also have an effect on adolescents’ sexual decision making and encourage the use of contraceptives. The increase in adolescent fertility rate, as stated before, could be the result of using less effective methods of contraception, perhaps because contraceptives are not covered by the prepaid insurance plans and the cost of obtaining them remains too high to facilitate their use, or it could indicate that the insurance coverage leads to a expectation of decreased medical costs involved in a pregnancy and therefore these costs do not create as
great of a deterrent to pregnancy. It is also possible that nations which rely more heavily on private insurance plans to finance medical costs are less inclined to include coverage of abortions so that fewer pregnancies are terminated.

**Implications**

The results of this study suggest that government involvement in health care financing can be very influential in decreasing the adolescent fertility rate and perhaps in increasing contraceptive use, although this is much less certain. In addition, it seems that the greatest effects on teen’s sexual decision making remains socioeconomic variables even after additionally exploring the role of health care access. In this case, governments should work to make investments in the holistic wellbeing of their citizens, including employment opportunities, living conditions free from impoverishment, and most notably education, in order to most effectively increase the ability of adolescents to make well-informed and smart decisions on matters of sexual health.

The analyses also suggest that relying on a privately financed health care system is less effective in reducing teen births than a mandatory, publicly financed one. If adolescent fertility rate is an issue which policy makers sincerely wish to address, they may need to widen their scope from specific actions such as small-scale provision of low cost contraceptives which may be less effective, to the larger institution of health care so that the most effective contraceptive methods can also be provided at a low cost. Additionally, the results suggest that the greatest way to increase the use of contraceptives and reduce the adolescent fertility rate is to make resources which accomplish these goals, namely contraceptives or abortions, as easily accessible as possible. When access is easy, perceived cost is lower and their use seems much more logical in light of the benefits which may be gained, making the chances of teens utilizing these services much higher.

**Future Research**

Possible future research which was only slightly explored in this study is the role of mandatory versus non-mandatory insurance policies within a nation. Although this study looked at health care costs for both public and private entities, it only touched on the issue of mandatory and non-mandatory coverage but nevertheless suggested that there is a notable difference in teens’ sexual decisions according to these different systems. A future study could create a more comprehensive classification of the insurance systems of the world’s countries and repeat the analysis which was completed in this study, namely comparing the rate of contraceptive use and adolescent fertility rate according to mandatory or non-mandatory coverage so that the relationship of insurance coverage and adolescent sexual decision making can be explored more fully.
References


