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Article

# Prevalence and Factors Associated with Teen Pregnancy in Vietnam: Results from Two National Surveys

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**Abstract:** This study asked two broad questions: (1) what is the prevalence of teen pregnancy in contemporary Vietnam; and (2) what selected social, family, and individual factors are associated with teen pregnancy in Vietnam? The study utilized Vietnam Survey Assessment of Vietnamese Youth surveys conducted in 2003 and 2008 to answer the two research questions within the context of fast political, economic, and social change in Vietnam in the last two decades. Results of this study show that the prevalence of pregnancy among Vietnamese teenagers in the surveys was stable at 4%, or 40 pregnancies per 1000 adolescent girls aged 14 to 19. Age, experience of domestic violence, and early sexual debut were positively correlated with higher odds of teenage pregnancy for both survey cohorts; however, being an ethnic minority, educational attainment, sexual education at school, Internet use, and depressive symptoms were significantly related to teenage pregnancy only in the 2008 cohort.

**Keywords:** teen pregnancy; Vietnam

## 1. Introduction

Approximately 16 million adolescents aged 15 to 19 become pregnant each year, constituting 11% of all births worldwide [1]. Despite rates of adolescent fertility declining globally in recent decades [1–4], teen pregnancies, births, and their associated negative outcomes remain serious problems in many countries. Complications during pregnancy and childbirth are consistently the second cause of death for girls aged 15 to 19 years old [1]. Babies of teen mothers are 50% more likely to be stillborn, die early, or develop acute and long-term health problems. Young girls who become pregnant are at high risk of abridged education [5], and thus limited economic prospects [1,2]. These and other negative outcomes of early childbearing in the well-being of young mothers and their children have resulted in heightened international efforts to identify sources of risk and protective factors, and to reduce adolescent pregnancy [1,2].

Teen pregnancy, regarded as a significant problem in many Western nations for several decades, has emerged only recently as a social problem in Vietnam because of the centuries-old tradition of arranged early marriage. Folk poems (Ca Dao) portray young girls who are married at age 12 or 13, and become unprepared mothers of five children by the time they are 18 [6]. Today, however, as Vietnam experiences rapid cultural shifts in the context of increasing globalization, this once half-mocking, half-endearing image of 18-year-old mothers of multiple children has taken on an entirely different meaning: one of shame, failure, and anxiety, not only for the young girls, but also for their families and larger society.

The rates of teen pregnancy and births in Vietnam compare favorably to neighboring and other low- and middle-income countries. According to the World Bank, birth rates per 1000 teenagers aged 15–19 in Vietnam fluctuated between 1980 and 2013, rising steadily from 20 per 1000 to 34 between 1980 and 1992, then declining to 28 in 2002. Rates rose again to 32 in 2007 before declining slightly to 30 in 2011, and 29 in 2013 [7]. These rates were lower than those of regional neighbors Indonesia, Malaysia, Cambodia, and Thailand, but higher than in Asia (with the exception of China) [7,8].

While data about teen pregnancy can be approximated using the national birth registration system, it is impossible to gauge precisely the prevalence of teen pregnancy in Vietnam because of its associated stigma. An alternate way of estimating rates of teen pregnancy is by using data on abortions, which indicate that about 20% of the 300,000 abortions performed annually in Vietnam involve teenagers [9,10]; thus, it is possible that the actual incidence of pregnancy among teens is higher than official birth data suggest [9–11].

As elsewhere, teen pregnancy in Vietnam should be understood and addressed in its particular historical and socio-cultural context. Teenagers becoming pregnant outside of marriage embodies nuanced interactions between two significant social transformations in Vietnamese society: the emergence of teenagers as an unprecedented distinct social group [12–14], and a quiet “sexual revolution” occurring in Vietnam, both of which accompany modernization and globalization [15,16]. Nguyen [12–14] suggests that since the end of the Vietnam War in 1975, the concept of adolescence in Vietnam has gone through three distinct phases corresponding to three political-social-economic phases of the country: adolescents as miniature communists (1975–1986); adolescents characterized by romantic sentiments, puberty, and identity search (1986–1995); and adolescents as the new “teen Viet” and vanguards of capitalist consumption (1996–2005). These distinct conceptualizations of adolescence influenced thoughts, attitudes, and behaviors of each respective cohort of Vietnamese adolescents, especially in relation to their sexuality.

Despite inconclusive data documenting adolescent pregnancy in Vietnam, the frequent practice of “underground” abortions contributes to a common public perception that since having sex during teenage years is becoming a norm among young people without being fully informed about sexual behaviors, unwanted teen pregnancy is increasing. Vietnamese government officials increasingly use words such as “alarming”, “trouble”, or “challenge” to talk about teen pregnancy, citing a steady rise in the annual number and incidence of teen pregnancies from 2.9% in 2009 to 3.2% in 2012, with 20% of all abortion cases in Vietnam being teenagers [17,18]. In popular media, stories about pregnant teenagers are often narrated with a melodramatic tone, adding to the anxiety of the larger Vietnamese society regarding sexual behavior among adolescents who are exposed to an unprecedented influx of Western sexual norms. Between public alarm over teenagers’ sexual behavior and the relative lack of scientific data on adolescent pregnancy, there is little reliable knowledge about the incidence of teen pregnancy, and patterns of differential risk of and protection from early conception in contemporary Vietnam.

This study aims to address this gap in knowledge by examining the prevalence of and selected factors associated with teen pregnancy in Vietnam. Two broad questions were asked: what is the prevalence of teen pregnancy in contemporary Vietnam; and what selected social, family, and individual factors are associated with teen pregnancy in Vietnam? The study utilized two national surveys conducted in 2003 and 2008 to answer the two research questions within the context of fast political, economic, and social change in Vietnam in the last two decades.

## 2. Literature Review

### 2.1. Prevalence of Teen Pregnancy and Births in the Global Context

There is a lack of data necessary to draw accurate portraits of pregnancy among adolescents worldwide; Sedgh, Finer, Bankole, Eilers and Singh [19] identify only 21 countries with complete statistics on pregnancy and birth outcomes among adolescents (including live births, spontaneous abortions, and induced abortions). Nevertheless, available birth data shows great differences in the

rates and prevalence of pregnancy between regions and countries. The average rate of teenage births ranges from the highest in Sub-Saharan Africa (143 per 1000 adolescent females), followed by the Americas (68), the Middle East and North Africa (56), and East and South Asia and the Pacific (56), to the lowest rates in Europe (25) [20].

Regional comparisons, while useful in indicating broad geographical patterns, do not reveal the wide disparities in adolescent pregnancies between and within countries resulting from their particular socio-political and cultural contexts. For example, in Sub-Saharan Africa, adolescent birth rates are 45 per 1000 teenagers in Mauritius, and 229 in Guinea [19]. In the Americas, the rate is 24 per 1000 in Canada, and 133 in Nicaragua [19]. The Middle East and northern parts of Africa, the eastern and southern parts of Asia, and the Pacific regions have the same average rates, including highs of 115 and 122 in Bangladesh and Oman, respectively, a low of 4 in Japan, and 18 in Tunisia [20]. In Southeast Asia, rates of teen pregnancy vary as widely as approximately 88 in Laos, 64 in Timor Leste, and 22 in Singapore. Europe has the lowest average, with four in Switzerland and 43 in Romania [19]. In general, these differences in adolescent birth rates are associated with broad measures of national economic well-being. Currently, upwards of 95% of all births to adolescents occur in low- and middle-income countries.

Worldwide there are striking similarities in the negative social, economic, and health outcomes associated with childbearing teens. Although adolescents account for about one-tenth of births internationally, they suffer almost one-fourth of the total incidence of poor health outcomes associated with pregnancy and childbirth [1]. Physical diseases such as anemia, malaria, HIV, and sexually transmitted diseases, as well as postpartum hemorrhaging, obstetric fistula, and the risk of maternal death, are all associated with childbearing youths. Additionally, young mothers are at heightened risk for mental health disorders such as depression in comparison to women who bear children at an older age [20]. Younger women are also more likely to smoke and ingest alcohol during pregnancy, and thus to experience pre-term labor. Adolescent childbearing poses risks to their offspring, including an elevated risk for low birthweight and asphyxia [20]. Children of teen mothers are also at heightened risk for physical abuse and other conditions that carry long-term developmental consequences, as well as other health-related risks that can affect their overall well-being [20].

## *2.2. Factors Associated with Teen Pregnancy and Childbearing*

Adolescent pregnancy and parenthood are not new phenomena worldwide; however, the circumstances in which young women become sexually active, conceive, and give birth, as well as the consequences of these behaviors, have changed considerably over time and across cultures. In many traditional kinship-based societies, such as in South Asia, the Middle East, and North Africa, girls are married as soon as they reach menarche, and begin childbearing soon after. Early conception in this milieu of early marriage has been culturally syntonetic, indeed typically planned, and thus historically not considered to be a problem for the young woman or her children. In contrast, during the 18th and 19th centuries in Western Europe and North America, young women did not marry at young ages and were strongly discouraged from having premarital sex; however, when conception occurred, marriage quickly followed. Early pregnancy legitimized by marriage was not considered problematic for young women, even if the pregnancy was unplanned [21].

Since the middle of the 20th century, the experience of adolescence has undergone significant shifts in Western Europe, the U.S., and other developed nations. Now, some similar changes are taking place in developing countries, including Vietnam and its Southeast Asian neighbors. The convergence of the steadily declining age of menarche with greater expectations for educational attainment for women has resulted in a longer period of fertility before marriage [22]. Other changes in social norms such as increased sexual freedom, individual autonomy from parental control, greater gender equality in the public and private spheres, and advances in contraceptive effectiveness have resulted in more young women becoming sexually active earlier. Not only is sexual activity commencing earlier, but it is also

outside of marriage. In general, young women have more control of their personal choices regarding sexual behaviors and activity.

These changes in the developmental context of adolescence in the West, where most research has focused, have resulted in strikingly divergent patterns of adolescent pregnancy within and between some countries. These patterns are found in places where there is significant income inequality, such as in the United States. Such contextual differences include both individual characteristics and certain features of the larger society that can influence a teen's sexuality-related choices. Over the last several decades in numerous Western nations, teenage pregnancy has become more directly related to social and economic status. Despite the dramatic overall decrease in adolescent pregnancy over recent decades, the United States and the United Kingdom continue to have the highest rates of pregnancy among adolescents in developed countries outside of the former Soviet bloc. There are significant and continuing differences in patterns of sexual activity and contraceptive use among adolescents that are strongly associated with racial and ethnic minority status, poverty, and their attendant multi-dimensional disadvantages [23]. As the rates of conception and childbirth among teens and the stigma of single motherhood have all decreased, the current "problem" of teen pregnancy has become concentrated among the poorest and most disadvantaged young people [24].

In nations that have significant income inequality such as the United States, several individual characteristics of adolescents who are at higher risk of conceiving include: early age of initiation of sexual activity; low expectations for, weak attachment to, and poor performance in school; engagement in problem behaviors such as drug and alcohol abuse, as well as various types of delinquency; being easily influenced by peers who participate in problem behaviors; and problematic family contexts, such as the presence of domestic violence and weak parental bonding. Recent research finds that teens living in rural communities, especially those with limited economic resources, are at significant risk of early conception, further indicating that the very conditions that give rise to early childbearing are identical to those that decrease the life chances of young people [22,24].

### 2.3. Teen Pregnancy in Vietnam: Historical Context

Until recently, Vietnam's 4000-year history was marked by constant struggles against foreign invasion, especially China; thus, Chinese influence on Vietnamese culture, particularly Confucianism, Taoism, and the Chinese version of Buddhism, took deep root. Confucianism in particular dictated that a woman must follow the rule of Three Submissions (*tam tong*): to her father when still living at home, to her husband when she gets married, and to her sons after her husband dies [16,25]. Confucianism also considered filial piety as one of the hallmarks of an individual's morality, and associated filial piety with being able to bear sons who could carry on the family name [26]. Until the early 20th century, young Vietnamese women's lives centered around marriage and reproduction, to the extent that they were expected to accept their husbands marrying multiple "little wives" in order to have sons [6,27,28]. Young women were also obliged to comply with arranged marriages, even if their husbands (young boys themselves) and in-laws thought of them mostly as maids in the house, and would wait the first few years of marriage to reach reproductive maturity to attain the full status of a wife [6,27]. In fact, many parents would promise their daughters to future in-laws just after birth, or when they were small children [29].

In this context, it was customary for young Vietnamese girls to get married and bear children in their teens regardless of whether they were psychologically or biologically ready. Once married, these young girls were considered adults with many family obligations. These family obligations included serving their husband and in-laws, taking care of housework, and working in the fields. Since there was no birth control, they often had one child rapidly after another. Until the 1960s, a typical woman in North Vietnam had an average of six children [30]. Most young women did not experience teenage years as a distinct developmental period in between childhood and adulthood, where an individual is occupied primarily with peers, school, first romantic relationships, and identity

development before making the transition into adulthood [6,12]; rather, young Vietnamese girls traditionally transitioned directly from childhood to adulthood through marriage and/or childbearing.

These norms continued well into the 20th century even after the French colonized Vietnam. In 1945, the Vietnamese people established the Independent Democratic Republic of Vietnam, which is today called the Socialist Republic of Vietnam [31]. This young nation faced many problems, the largest being widespread poverty and approaching war. Consequently, between 1945 and the end of the Vietnam War in 1975, family planning and population policies were developed to achieve two primary purposes: to reduce poverty, and to save “human force” for war efforts [10,16]. During the wars, young women and men were encouraged to follow the Three-Delay Movement: delay falling in love, delay getting married, and delay having children [12]. Young women’s reproductive health became a realm governed by the state, and the act of getting married and/or becoming pregnant was frowned upon as a selfish act made at the cost of the nation’s well-being [32].

Following the end of the Vietnam War in 1975, 75% of the Vietnamese population was poor [33]. In response, the Vietnamese government issued a decree in 1978 recommending that families have no more than two children [32]. In 1984, the Vietnamese government enforced a law that each Vietnamese family was permitted to have a maximum of two children, with the two births spaced five years apart [32]. Families that violated the new law were punished with pay cuts, demotion, or they were banned from relocating to urban areas [34].

In parallel with strong family planning policies, the Vietnamese government also united the northern and southern educational systems by creating one universal 12-grade education system [12,13]. In the 1990s, the number of youths enrolled in secondary school, high school, and college increased by 66%, 63%, and 132%, respectively, creating for the first time in Vietnam’s history a distinct group of young people who experienced a stage of extended education between childhood and adulthood [35]. These large-scale social policies also connected fewer births and higher education with “family happiness” (*hanh phuc gia dinh*), as well as better career prospects, sending a new message to young Vietnamese women that their lives were not centered around childbearing and rearing.

Vietnam adopted a market economy in 1986 in order to boost the economy, and by 1993, the poverty rate fell to 58% [33]. With an average annual GDP growth rate of 7.2% between 2002 and 2011, poverty fell to 14.5% in 2008 [36]. However, income inequality also rose quickly in Vietnam, and extreme poverty became chronic among certain groups. Ethnic minorities living in rural and mountainous areas had the highest rate of poverty at 52% [36]. Between 2002 and 2008, the poverty rate of the Kinh people fell from 23% to 9%, while in 2008, three major non-Kinh groups still had poverty rates of over 60% [37]. Poverty reduction campaigns have been slow to reach the ethnic minorities, complicated by the fact that many ethnic minority groups do not speak the Vietnamese language.

#### 2.4. Sexual Behavior among Contemporary Vietnamese Adolescents

In Vietnam today, teenagers comprise a distinct group of the population, but have not been the subject of much research. In the Vietnamese media, news and information about the sexual and reproductive behaviors of Vietnamese adolescents are a frequent source of national attention and uproar, to the extent that it became a debate topic at several annual meetings of the National Assembly. Recent evidence finds that more Vietnamese teenagers are having sex outside of marriage and at earlier ages [38,39]. Moreover, similar to the patterns in Western nations, Vietnamese teen pregnancy increasingly occurs alongside rising occurrences of drug addiction, delinquency, high-risk sexual activity resulting in HIV/AIDS, and other behaviors, causing public concern across Vietnamese society. A report by United Nations Population Fund—Vietnam revealed that 20% of students are sexually active, but less than 0.5% of them know how to avoid pregnancy [40]. Other research finds that 57% of Vietnamese youth report comprehensive knowledge of HIV transmission, far less than the national target of 95%, and less than other countries, while 36% have risk of discrimination against people living with HIV and 7% have high risk of contracting HIV themselves due to lack of knowledge [41]. About

47% of adolescents ages 15 and over report that they smoke and more than half of 150,000 people injecting drugs started using during their teen years [39].

The few studies of factors associated with teen pregnancy in Vietnam suggest that, similar to the situation in the United States and other countries with significant income disparity, poverty, dropping out of school, and “broken” families are the strongest predictors [42]. In a study in Ho Chi Minh City, Huynh Nguyen Khanh Trang concluded that being young, not getting married, not watching sex education programs on television, and not knowing the consequences of abortion are factors associated with teen abortion [42]. A study by Ngo Thi Kim Phung and Huynh Thanh Huong at Tu Du Hospital in Ho Chi Minh City showed that young girls living in rural areas are 5.7 times more likely than their urban counterparts to seek abortions, potentially because it is more difficult to hide a pregnant teenager in rural areas. They also found that unmarried pregnant teenagers are 17 times more likely than those who are married to seek abortions, while unemployed pregnant teenagers are 10.3 times more likely than those who are employed to seek abortions [42]. Additionally, girls who are unaware of their ovulation cycles are 2.3 times more likely to have an abortion than those who have this knowledge. Among ethnic minority groups in Vietnam, prescribing to early marriage customs and lack of information about reproductive health are also associated with teen pregnancy [9].

### 3. Methods

This study was designed to examine not only what selected factors predict teen pregnancy among Vietnamese youth, but also whether there have been changes in the risk factors attending the larger socio-cultural changes that come with modernization and globalization. The research uses secondary data analysis drawing upon the two waves (2003 and 2008) of samples from the Vietnam Survey Assessment of Vietnamese Youth (VNSAVY). VNSAVY is the largest and most comprehensive survey in Vietnam to examine health and well-being among Vietnamese youth and young adults, and is funded by the World Health Organization (WHO). The first VNSAVY (VNSAVY1) was conducted in 2003 with 7584 youths aged between 14 and 25 years living in 42 out of 63 provinces of Vietnam. The second VNSAVY (VNSAVY2) was conducted in 2008 with 10,004 youths aged between 14 and 25 in all 63 provinces and cities of Vietnam. This paper utilizes VNSAVY subsamples that include teenage girls, ages 14 to 19 years old. Our analytic sample sizes includes 2325 teenagers for VNSAVY1 (30.7% of the overall sample) and 3287 teenagers for VNSAVY2 (32.7% of the overall sample).

#### 3.1. Variables

*Teenage pregnancy.* Teenage pregnancy was measured by the item “Have you ever been pregnant”, which was asked of all female respondents regardless of their age. The answer options included Yes (1) and No (0).

*Demographic backgrounds.* The variables that captured the demographic information of the samples included age, ethnicity, education attainment, urban residency, and household ownership. Age was a continuous variable that ranged from 14 to 19 years old. However, as teenage pregnancy was distributed unevenly across age, we further binarily coded the age variable into “at or below 17 years-old” vs. “18 or 19 years old”. Because the sample sizes for ethnic minority groups were small, the variable “ethnicity” was recorded into Kinh and other ethnicities (Kinh: 0 vs. Others: 1), despite the fact there are more than five ethnicity groups in Vietnam. Educational attainment was also dichotomized (Less than high school: 0 vs. High school or higher: 1). Urban residency was a binary variable (Rural: 0 vs. Urban: 1). Finally, to capture the economic status of teenaged girls’ families, a composite score was created to summarize how many household items the teenage girls’ families owned. These household items were on a list of 11 household items, such as a car, refrigerator, cell phone, and other common household goods. A boat, however, was originally listed on both waves of the survey but was later omitted due to additional analysis on its psychometric properties. The H coefficient of this item in the Mokken Scale analysis was lower than 0.3, representing the inability to measure this particular item with the rest of the items [43–45]. The Internet item was added in the

2008 VNSAVY survey, and was incorporated into the computation of household ownerships to reflect the rapid changes in Vietnamese households during this time period. To assist in comparisons across waves, the composite scores were further divided by the number of items incorporated in calculation for each wave of the survey (ten items in VNSAVY1 and 11 items in VNSAVY2). The composite scores in both waves ranged from 0 to 1, with higher scores representing greater proportions of listed items owned by the households.

*Parental divorce.* Parental divorce was computed by two items in both waves of VNSAVY. If a respondent answered “divorce” to either of the items “The reasons your biological father does not live with you” or “The reasons your biological mother does not live with you”, she would be considered having experienced parental divorce. The variable parental divorce was binaurally coded (No: 0 vs. Yes: 1).

*Sexual education by parent and at school.* The variables “sexual education by parent” and “sexual education at school” were computed by a set of related items; however, the item formats were slightly changed between the two waves of the survey. In VNSAVY1, a multiple-choice item asked respondents to select from which sources they “heard about the following topics, including family planning, pregnancy/menstruation, gender and sexual relationships, and love and marriage”. The item listed 16 potential sources and asked respondents to select all that applied. The variable “sexual education by parent” was coded 1 if either “father” or “mother” was selected. The variable “sexual education at school” was coded 1 if respondents selected “teachers” in their responses. In contrast, in VNSAVY2 the four different topics listed above were probed in separate items. These four items asked respondents to name the top three information sources. The variable “sexual education by parent” was coded 1 if either “father” or “mother” was selected for any of the four topics. Similarly, the variable “sexual education at school” was coded 1 if respondents selected “teachers” in their responses for any of the four topics. Therefore, both variables, sexual education by parent and at school, were binaurally coded (No: 0 vs. Any: 1).

*Internet use.* Internet use was measured by one item in both waves of the survey question “Did you ever use the internet?” (No: 0 vs. Yes: 1).

*Domestic violence.* Domestic violence was captured by a set of related items in both datasets. If a respondent answered yes to either of the items “Have you ever been injured as a result of violence from a family member?” or “Has your spouse done any of the following things to you, including yelling, prohibiting you from doing certain things, and hitting”, the variable “domestic violence” would be coded 1. The variable “domestic violence” was binaurally coded (Never: 0 vs. Any: 1).

*Early sexual debut.* Early sexual debut was measured by an item that asked at which age the respondents had their first sexual experiences. In the local Vietnamese context, we defined early sexual debut as having their first sexual experience at age 17 or younger. Teenage girls who have not had any sexual experiences would be considered not having early sexual debut. The variable early sexual debut was binaurally coded as a result (No: 0 vs. Yes: 1).

*Positive outlook.* Positive outlook was measured by a set of 10 related items in both waves of the survey; however, due to low overall reliability, six items were selected to compute the composite scores that optimized the reliability. The final reliabilities were 0.68 and 0.66 for wave one and wave two surveys, respectively. A few sampled items read “I have a few good qualities”, “I will have a happy family in the future”, and “I will have opportunities to do what I want”. Respondents could answer “disagree” (1); “partially agree” (2); and “agree” (3) to each item. The composite score was a continuous variable and ranged from 1 to 3, with higher scores representing greater positive outlook.

*Depressive symptomatology.* Five related items were selected to measure the depressive symptomatology among the teenage girls. Sampled items read “Have you ever felt so sad or helpless that you stopped doing your usual activities?” and “Have you ever felt really hopeless about your future?” The respondents answered “Yes” (1) or “No” (0) to each item. A composite score was created to sum up the six items. Additional Mokken Scale analysis suggested that the average H coefficients of



these items were greater than 0.3 in both waves of survey, indicating these items were scalable to form an index measuring depressive symptomatology among Vietnamese youths [43–45].

*Negative peer norms.* Seven related items were used to measure perceived negative peer norms among Vietnamese teenage girls. Sample questions read “Is there any pressure from your friends for you to do the following: smoking” and “Is there any pressure from your friends for you to do the following: trying drugs”. Respondents could answer “no pressure” (1); “a little pressure” (2); and “some pressure” (3) to each item. The reliability of these items in both waves of survey was very satisfactory (Cronbach’s alphas = 0.90 and 0.87 in VNSAVY1 and VNSAVY2, respectively). A composite score was created that averaged the scores over the seven items. The composite score was a continuous variable ranging from 1 to 3, with higher values representing greater levels of perceived negative peer norms.

*Positive peer norms.* Similar seven related items were used to measure perceived positive peer norms among Vietnamese teenage girls. Sampled questions read “Do your friends encourage you to avoid smoking” and “Do your friends encourage you to avoid trying drugs”. Respondents could answer “Yes” (1) or “No” (0) to each item. The reliability of these items in both waves of survey was very satisfactory (Cronbach’s alphas = 0.93 and 0.94 in Waves 1 and 2, respectively). A composite score was created that averaged the scores over the seven items. The composite score was a continuous variable ranging from 0 to 1, with higher values representing greater levels of perceived positive peer norms.

### 3.2. Analytic Approaches

Descriptive statistics were first applied to estimate the prevalence rates of pregnancy as well as distributions of selected variables among Vietnamese teenage girls in both cohorts. Wald tests were utilized to evaluate differences in prevalence rates of pregnancy and distributions of selected variables across two waves of the survey. A logistic regression model was further applied in both waves of the survey to estimate the relationships between teenage pregnancy and selected variables within each cohort of teenage girls. Finally, Wald tests were used again to compare the estimated relationships across waves. To better account for complex study designs, survey weights were applied throughout the analyses. Jackknife was applied to calculate the standard errors for statistical inferences. Domain analysis was applied because in this study, only teenage girls aged 14 to 19 were included. All the statistical computations were carried out in a commercial software package, Stata 13, with SVY procedure [46].

## 4. Results

### 4.1. Prevalence Rates of Teenage Pregnancy and Overall Changes in Characteristics among Teenage Girls in Vietnam

Table 1 summarizes the descriptive analysis. The prevalence rates of pregnancy among teenage girls in Vietnam were about 4% in both waves of the survey, and were not significantly different at 0.05 levels ( $p$ -Value = 0.340), suggesting that the teenage pregnancy rates remained stable during the two time points. We re-estimated the prevalence rate of teenage pregnancy in the 2008 survey using the original provinces covered in 2003. The results (not shown) show that the differences between the two approaches are below 0.35%, which is negligible. Age distribution among pregnant girls in the two cohorts is summarized in Table 2. Kinh remained the majority ethnic group, consisting of 84% of the Vietnamese teenage girls across time points. Both waves indicated that only about 11% of the teenage girls resided in urban settings. The parental divorce rates also remained stable across both survey waves, with roughly 3% of the teenage girl population in both cohorts. The rates of early sexual debut also remained at about 2% of the teenage girls. The two cohorts of teenage girls also perceived similar levels of negative peer norms. Despite these similarities, there were some significant changes among the Vietnamese teenage girl population across the two cohorts.

**Table 1.** Demographic descriptions of Vietnamese teenage girls across two cohorts (2003 vs. 2008).

	2003 (%)	2008 (%)	<i>p</i> -Value
Teenage Pregnancy	3.75	4.41 (4.75 ~)	0.340
Ethnicity			
Kinh	84.40	84.20	0.934
Others	15.60	15.80	
Education			
Less than high school	59.80	41.60	<0.001
High school or Higher	40.20	58.40	
Urban Residency			
Rural	89.20	89.50	0.889
Urban	10.80	10.50	
Parental Divorce			
No	97.00	94.77	0.339
Yes	3.00	2.56	
Sexual Education by Parent			<0.001
No	14.32	7.97	<0.001
Yes	85.68	92.03	
Sexual Education at School			<0.001
No	14.6	46.59	<0.001
Yes	85.4	53.41	
Internet Use			<0.001
No	84.72	60.85	<0.001
Yes	15.28	39.15	
Domestic Violence			<0.001
No	97.39	94.80	<0.001
Ever	2.61	5.20	
Early Sexual Debut			
No	97.94	98.39	0.347
Yes	2.06	1.61	
	<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b><i>p</i>-Value</b>
Age	16.34 (1.66)	16.19 (1.63)	0.006
Household Ownership	0.43 (0.22)	0.56 (0.19)	<0.001
Positive Outlook	2.61 (0.33)	2.70 (0.31)	<0.001
Depressive symptoms	0.92 (1.14)	1.45 (1.15)	<0.001
Negative Peer Norms	1.02 (0.13)	1.02 (0.11)	0.586
Positive Peer Norms	0.73 (0.40)	0.82 (0.35)	0.031

~: Calculation using original provinces covered in Survey Assessment of Vietnamese Youth (SAVY1).  
Data: Survey Assessment of Vietnamese Youth 2003 and 2008.

**Table 2.** Teen pregnancy rates by age in Vietnam (2003 vs. 2008).

Age	2003	2008
14	0.00%	0.00%
15	0.00%	0.00%
16	0.10%	0.87%
17	2.37%	3.77%
18	7.53%	9.99%
19	15.90%	20.13%

Data: Survey Assessment of Vietnamese Youth 2003 and 2008.

Overall, teenage girls in the 2008 cohort were more likely to receive high school-level education (40.20% vs. 58.4%,  $p < 0.001$ ), to receive information regarding sexuality and relationships from parents (85.68% vs. 92.03%,  $p < 0.001$ ), to have ever used the Internet (15.28% vs. 39.15%,  $p < 0.001$ ), and to report experiences of domestic violence (2.61% vs. 5.20%,  $p < 0.001$ ). In the second cohort, Vietnamese teenage girls also enjoyed more household goods (0.43 vs. 0.56,  $p < 0.001$ ), had higher levels of positive outlook (2.61 vs. 2.70,  $p < 0.001$ ), perceived higher levels of positive peer norms (0.73 vs. 0.82,  $p = 0.031$ ), but also suffered from greater levels of depressive symptomatology (0.92 vs. 1.45,  $p < 0.001$ ). In the second cohort, surprisingly fewer teenage girls received information regarding sexuality and relationships from formal education (85.40% vs. 53.41%,  $p < 0.001$ ). This may be partially due to the format changes of related items across the questionnaires.

#### 4.2. Protective and Risk Factors for Pregnancy among Teenage Girls in Vietnam across Cohorts

Table 3 summarizes and presents the fitting results of weighted logistic regression models. In VNSAVY1, being 18 and 19 years old ( $p < 0.001$ ), experiences of domestic violence ( $p < 0.001$ ), and experiences of early sexual debut ( $p < 0.001$ ) were associated with higher odds of pregnancy among the teenage girl population. Internet use ( $p = 0.006$ ) and higher levels of depressive symptomatology ( $p = 0.005$ ) were associated with lower odds of pregnancy. In contrast, in VNSAVY1I, being 18 and 19 years old ( $p < 0.001$ ), having experiences of domestic violence ( $p < 0.001$ ), and having experiences of early sexual debut ( $p < 0.001$ ) were associated with higher odds of teenage pregnancy. Internet use ( $p = 0.006$ ) was associated with lower odds of teenage pregnancy. Having more household goods ( $p = 0.071$ ) and urban residency ( $p = 0.084$ ) were marginally related to lower teenage pregnancy. Finally, the receipt of sexual education at school ( $p = 0.021$ ) was associated with lower odds of pregnancy.

**Table 3.** Logistic regression with teenage pregnancy in Vietnam as the outcome (2003 vs. 2008).

-	2003			2008			Difference	
	A.O.R. <sup>1</sup>	S.E. <sup>2</sup>	<i>p</i> -Value	A.O.R.	S.E.	<i>p</i> -Value	F <sup>3</sup>	<i>p</i> -Value
Age (18–19 vs. ≤17)	47.56	24.22	<0.001	23.40	6.39	<0.001	1.52	0.222
Ethnicity (Others vs. Kinh)	1.33	0.50	0.44	1.27	0.34	0.362	0.01	0.927
Household Ownership	2.02	1.48	0.343	0.25	0.19	0.071	5.17	0.026
Urban Residency (Urban vs. Rural)	0.48	0.21	0.105	0.44	0.21	0.084	0.02	0.903
Parental Divorce (Yes vs. No)	1.28	1.13	0.785	0.76	0.50	0.682	0.22	0.639
Sexual Edu by Parent (Yes vs. No)	1.09	0.50	0.848	0.61	0.24	0.212	1.00	0.321
Sexual Edu at School (Yes vs. No)	0.87	0.31	0.693	0.42	0.10	<b>0.001</b>	2.84	0.097
Internet Use (Yes vs. No)	0.09	0.08	<b>0.006</b>	0.24	0.12	<b>0.006</b>	0.86	0.356
Domestic Violence (Yes vs. No)	21.26	12.12	<0.001	6.20	2.23	<0.001	3.06	0.085
Early Sexual Debut (Yes vs. No)	396.98	418.83	<0.001	64.69	40.61	<0.001	2.06	0.156
Positive Outlook	1.02	0.51	0.967	1.46	0.49	0.263	0.40	0.527
Depressive symptoms	0.61	0.10	<b>0.005</b>	0.83	0.10	0.144	1.90	0.173
Negative Peer Norms	2.51	2.16	0.289	0.67	0.72	0.709	0.98	0.326
Positive Peer Norms	0.78	0.26	0.449	1.53	0.56	0.249	1.62	0.208
Constant	0.00	0.00	<0.001	0.01	0.02	0.003	–	–
Joint Test	–	–	–	–	–	–	1.68	0.09

<sup>1</sup>: A.O.R. = Adjusted Odds Ratio; <sup>2</sup>: S.E. = Standard Error; <sup>3</sup>: F = F-statistics from Wald Tests; Boldface numbers indicates the *p*-Values smaller than 0.05. Data: Survey Assessment of Vietnamese Youth 2003 and 2008.

From these model-fitting results, it was clear that in both Waves 1 and 2, age, domestic violence, and early sexual debut were positively correlated with higher odds of teenage pregnancy among Vietnamese teenage girls, while sexual education at school, Internet use, and depressive symptomatology were significantly related to teenage pregnancy in either one or both cohorts. The Wald tests revealed that the estimated relationships between teenage pregnancy and selected factors were not significantly different across the two waves of the survey, except for household ownerships. Note that the relationships between household ownerships and teenage pregnancy were not significant at the 0.05 level in either cohort. The joint Wald test was also insignificant at the 0.05 level, suggesting that, overall, the relationships between teenage pregnancy and selected

factors were stable across two cohorts. We also noted that sexual education in school was significantly associated with teenage pregnancy in the 2008 cohort but not in the 2003 cohort, and this difference reached significance at the 0.1 level. Similarly, the difference in the magnitude of relationships between domestic violence and teenage pregnancy across cohorts reached significance at the 0.1 level.

## 5. Discussion

Results of this study show that the prevalence of pregnancy among Vietnamese teenagers in the national surveys conducted in 2003 and 2008 was stable at 4%, or 40 pregnancies per 1000 adolescent girls aged 14 to 19. When VNSAVY2 was conducted in 2008, rates in Vietnam were lower than in less-developed Asian countries, such as Laos, Bangladesh, and Timor Lester, and higher than in highly westernized Asian countries such as Singapore, Japan, and Hong Kong [19]. Overall, Vietnam's rate of teen pregnancy is significantly lower than that of Sub-Saharan African countries, but is significantly higher than in most Western European countries (with the exception of England) and, notably, higher than the U.S. [2,4,47].

Although rates of teen pregnancy in Vietnam were similar in 2003 and 2008, there are important differences between the pregnant teens in these two cohorts. Age, experience of domestic violence, and early sexual debut were positively correlated with higher odds of teenage pregnancy for both cohorts; however, ethnicity, educational attainment, sexual education at school, Internet use, and depressive symptomatology were significantly related to teenage pregnancy only in the 2008 cohort. In 2003, teenagers who became pregnant tended to live in families with a history of domestic violence, started having sex earlier than their peers, and became pregnant between the ages of 15 and 18. They were also more likely to live in urban areas and did not receive sex education from their families or at school. In many ways, the profile of pregnant teenagers in Vietnam in the 2003 cohort resembled that of disadvantaged youth in poor urban neighborhoods in developed countries.

The pregnant teenagers in 2008 also reported a history of domestic violence but were more likely to be living in rural and/or remote mountainous areas. They did not have access to the Internet, tended to have lower levels of education, received little or no sex education at school, and reported depressive symptoms. Within the larger category of rural pregnant teens, they seemed to fall into two distinct sub-groups. One group consisted of teenagers from ethnic minorities, likely living in isolated mountainous areas where they had to travel far to attend school, and where they worked in the fields to help their parents earn a living. Since it was difficult for them to go to school, many of them eventually dropped out and began working full-time in the fields. They married in their late teens and subsequently became pregnant. For these teenagers, getting pregnant at 16 or 17 would not necessarily be problematic, but rather resulted from the normative expectations of traditional ethnic minorities living in the high mountains. The other group of pregnant teenagers in the 2008 cohort consisted primarily of young women who were not members of an ethnic minority, but also lived in rural, economically disadvantaged areas, and faced barriers to obtaining general education, including sex education. These young women might also consider early marriage and childbearing as normative in rural areas rather than a social problem.

The differences found between Vietnamese pregnant teenagers in 2003 and in 2008 paralleled differences in the general characteristics of teenagers, embedded in larger political, economic, and social changes of Vietnam in the last two decades. Within the five years that separated the two surveys, Vietnam experienced significant sociocultural shifts; thus, the two cohorts of teenagers were exposed to very different political, economic, and social contexts. Teenagers in the 2003 cohort came of age in the late 1990s and early 2000s, which was the beginning of globalization in Vietnam. At that time, only 3% of the population used the Internet, which was available only in urban areas [48]. Consequently, teenagers did not have direct access to foreign sources, news, or other information available by 2008. However, through pervasive distribution of teen magazines, newspapers (such as *Hoa Hoc Tro*), and national television and radio programs, Vietnamese teenagers in 2003 received a rather unified exposure to Western culture, particularly American teen culture [13,14]. During the

early 2000s, the English term “teen” was first borrowed from the American media and appeared in the most influential newspapers targeting adolescents in Vietnam [14]. It first appeared in 2001 in *Hoa Hoc Tro*, and quickly spread to become a household word denoting a new social group in Vietnam: the “teen Viet”. Thus, the youth coming of age in the late 1990s and early 2000s were the first generation exposed to the idea that the teenage years represented a distinct culture characterized by consumption, and accentuating one’s identity through bodily beauty and accessories. This was also the first time that Vietnamese teenagers were exposed to the idea that being “sexy” was “cool”, rather than being an indicator of immorality or a barrier to academic achievement as in the past [14].

In contrast, the 2008 cohort included those who came of age when important aspects of globalization began to influence the daily life of Vietnamese. Only five years after 2003, the number of Internet users in Vietnam had increased seven times to nearly 21 million users, making Vietnam one of the fastest-growing countries in Internet use [48]. The Internet became ubiquitous in urban areas and much more accessible in rural areas, with young people between 14 and 24 accounting for nearly 40% of the users [49]. As a result, changes in teen culture often started in urban areas and diffused to rural and remote areas in the manner of circles and waves.

The outward exodus of teen pregnancy observed in this study might have been the result of a ripple effect of urbanization, modernization, and westernization in Vietnam, both in terms of socioeconomic improvement and cultural shifts. In particular, between the years 2003 and 2008, the average income in urban areas grew twice as much as that in rural areas [50]. For remote areas, the gap is even bigger. In fact, in many remote areas in Vietnam, living conditions have remained virtually unchanged over the last few decades. Malnutrition rates among ethnic minority children are twice those of the Kinh people. Only 13% of the two largest ethnic minority groups in Vietnam attend junior high school compared to 65% of the two majority groups [50].

The fact that urban Vietnamese youths stay in school longer compared to those in rural and/or mountainous areas might make urban youths delay marriage and childbearing. As a result, these youth become more careful in their sexual risk-taking. At the same time, improved economic conditions have led to an explosion in Internet access, which provides teenagers with easy and unprecedented access to a means of satisfying their sexual curiosity, as well as learning about risky sexual behaviors. The significance of this development is suggested by results of the final report of VNSAVY 1, which shows that Vietnamese teenagers used the mass media as a primary source of information, especially when it came to issues related to friendship, romantic relationships, and sexuality [38].

Urbanization, modernization, and westernization have also led to an import of Western sexual norms, including teenagers becoming more accepting of pre-marital sex. Through Western movies, news, music, and social media, Vietnamese teenagers in urban areas have learned that it is normal for teenagers in the Western world to have sex while in high school. They also have learned the negative consequences associated with teen pregnancy, even if they did not obtain comprehensive knowledge about safe sex. At the same time, young Vietnamese people are acutely aware that their parents and grandparents, indoctrinated with communist and Confucian ideologies that pre-marital sex is immoral and ruined the future of young women, strongly oppose such practices. As a result, urban teenagers quickly absorbed Western sexual norms but also the benefits of informal sex education. In contrast to urban areas, rural and remote/mountainous areas are slow to benefit from economic improvement and the import of Western sexual norms, as they still preserve traditional customs of early marriage and motherhood. Such unequal patterns of change are evident in the expanding income inequality between urban and rural areas in Vietnam, with poverty currently concentrating on ethnic minorities living in mountainous areas [50] (World Bank, 2014).

## 6. Implications

What are the implications of these shifts in the differential risk of teen pregnancy in Vietnam? Studies have consistently shown that children born to teen mothers are more likely to develop short-term and long-term negative health outcomes. Teen mothers are living primarily in rural and/or remote mountainous areas where there are limited health resources. As a result, Vietnam should develop new formal and informal services in rural areas to support teen mothers. At the same time, teen mothers who are following the traditional patterns of their communities in becoming mothers at young ages might not feel marginalized or stigmatized, and do not wish to seek services available to them. Moreover, Vietnamese children are often raised and cared for by the whole extended family or village; this would result in an informal support system for young mothers. This might mean that Vietnam needs a comprehensive intervention plan that addresses not only the socioeconomic but also the cultural and religious factors that lead to teen pregnancy and motherhood. Vietnam may also need long-term community-based intervention programs that employ local people (commune health staff, village elders, local monks/nuns/priests/spiritual leaders) rather than Western public health campaigns and measures. Promoting education and developing strong, focused sex education programs at schools in rural and/or mountainous areas may be important as well.

The above findings suggest that Vietnam might face challenges in reducing teen pregnancy in the years to come if there remain social, economic, and cultural segregation in the country; thus, for Vietnam to reduce teen pregnancy, there must be localized as well as large-scale national strategies to improve overall socio-economic conditions in all geographic regions in the country.

### *Limitations and Future Research*

This study has several limitations. First, data of the study are cross-sectional, which limits the ability to establish a causal direction between independent variables and dependent variables. Second, the survey questionnaires used for the two waves were worded slightly differently in a few items, thus participants might have responded differently depending on their interpretation. In particular, for the 2008 survey, sex education at schools was incorporated under the umbrella item of “sex education through formal channels”, which also included formal public health propaganda in the mass media, and neighborhood-based health education. As a result, researchers were not sure about the unique impact of sex education at schools on teen pregnancy for the 2008 cohort. We were also unable to establish whether or not the pregnant teens were married because of the ways the survey questions on pregnancy and marital status were structured. However, teen pregnancy rates were almost zero through age 17 and very high at ages 18 and 19, indicating that pregnancies among Vietnamese teenage girls might be marital. Most significantly, there could be under-reporting about teen pregnancy by survey participants due to the stigma associated with engaging in sexual activity at early ages, and pregnancy during adolescence. However, even with these limitations, the study yields insights that are helpful in understanding teen pregnancy in the context of the fast and profound changes in Vietnam. Future studies can address these limitations and combine quantitative research with qualitative research in order to allow in-depth understanding of teen pregnancy from the Vietnamese teenagers’ viewpoint.

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