

Community Follow-Up of a Cohort of Adolescents Who Dropped Out of Middle Schools in Nuevo León, Mexico

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ABSTRACT

Objective: To compare the health status, education, and employment situation in a group that dropped out of high school with another group that finished it.

Methods: The design is a longitudinal, retrospective, comparative, analytical, community-based study, with house-to-house interviews in four neighborhoods of a municipality north of Nuevo León, Mexico. Two groups of adolescents were included: one that finished three years of high school and another that interrupted it. Absent adolescents not found in three periodic visits or without informed consent were excluded. The main measurements were completed high school or self-reported school dropout, pregnancies, current work and educational conditions, and other reproductive health data. A survey was used on general, academic, and work data and the cause of dropout. Data analysis was descriptive and inferential with a chi-square test and T-test for independent groups; 95% CI and $P < .05$ for statistical significance.

Results: 116 adolescents were found; 82 who finished high school and 12 who interrupted it were viable. Those who dropped out are currently studying less frequently; they are more likely to have sexual relations ($p < .05$) and current pregnancies ($P = .01$). Pregnancy was an important cause of dropping out.

Conclusions: Pregnancy is a reported cause but not the only cause of school dropout; besides, there is more sexual activity without contraception and future pregnancies in those who drop out of secondary school. This situation, their inactive labor status and disadvantageous family conditions configure greater parity and economic and social vulnerability.

Keywords

Pregnancy in adolescents, School dropout, Middle school, Adolescent sexuality, Pregnancy prevention.

Abbreviations

CI 95%: 95% Confidence interval, SD: Standard deviation, HR: Hazard ratio, OR: Odds ratio, STROBE: The Strengthening of

the Reporting of Observational Studies in Epidemiology. Middle school: In Mexico include 7° to 9° grades.

Introduction

Pregnancy in adolescents, planned or not, is a global public health problem [1]. Adolescence is characterized by an accelerated pace of changes, which give rise to behaviors that impact health,

including pregnancy in adolescence. Various factors are associated with the higher incidence of this problem, mainly those related to school education [2]. It is indisputable that the reproductive health of adolescents varies in the different regions of the country [3]. However, in Mexico, the Pregnancy and Fertility Rate in Adolescents (TEFA) in 2023 was 60.3 births per thousand adolescents aged 15 to 19 [4]. Despite sustained efforts by National Strategy [3], the situation was compromised due to the advent of the COVID-19 Pandemic in March 2021 in Mexico [5].

Pregnancy in adolescence causes serious complications for the mother and the child [6]. A frequently mentioned risk factor is related to educational aspects: low schooling, rejection of school and dropout [7]. School dropout is defined as moving away, separating or abandoning the teaching-learning process to leave the school system before having finished [8], which encourages unemployment and perpetuates poverty and marginalization [9]. In addition, its causes are varied, including the educational factors mentioned [10,11]. Pregnancy, during school years, generates in the adolescent fear of rejection, shame or hostility that must be faced [12]. However, in Mexico, there are not many studies that associate these two phenomena, for example, women with an educational gap are twice as likely to have a history of pregnancy (OR=2.4) [10]. Additionally, eight women out of ten with at least one live-born child, have an educational gap [13]. This suggests that teenage pregnancy causes a decrease in years of schooling [14].

In the state of Nuevo Leon, there is no data about what happens to adolescents who drop out of middle school, nor the frequency of their obstetric events such as pregnancy, childbirth and abortion and the health risks outside the educational system. The municipality of Cienega de Flores, Nuevo Leon, seemed ideal for this purpose, given that it has registered a notable population growth with age groups, 23.5% from 15 to 24 years [15]. The findings derived from this research could help implement preventive programs to reduce school dropouts or initiatives that reintegrate adolescents into education and provide development opportunities within their communities.

The general objective of this research is to conduct a community follow-up of middle school graduates, whether they have finished it or not, to estimate the frequency of dropouts, their attributed causes, and their evolution in terms of health, educational and employment opportunities compared to a sample of adolescents who completed three years of study.

Methods

Design

This was a community study using a retrospective cohort-type house-to-house survey in four neighborhoods of Cienega de Flores: Col. Real de Sol, 1 and 2, with 93 homes; Col. Villas de Alcala, with 43 homes; and Col. Santa Lucía, with 22 homes out of a total of 36 neighborhoods. The community of Cienega de Flores is primarily composed of a lower-middle socioeconomic population.

The selection was non-probabilistic, including students who attended middle school from 2017 to 2021, regardless of whether they had finished it. Two groups were formed for comparison purposes. Minors or those whose parents did not agree to collaborate with the study, emancipated adults who did not wish to participate, and adolescents still enrolled in middle school were excluded. Adolescents who were not found after three attempts to locate them in person or virtually, and those who refused to participate or provide data were eliminated. Sample design. A survey was conducted per home in each neighborhood, starting at the southeast corner clockwise until the established perimeter was completed.

A data form was applied with a filter question to determine if the student had dropped out. Questions covered demographic information, school data and school dropout factors, reproductive health, and some health risk behaviors. After training, 42 undergraduate students from the (Autonomous University of Nuevo Leon (UANL) School of Medicine began community study in September 2022.

Data Analysis

Data were captured in the statistical package SPSS Version 20 for Windows, processed as percentages and frequencies, and chi-square or McWhinney tests were used for numerical variables, with $p < 0.05$ as significant. When appropriate, odds ratios (ORs) and 95% confidence intervals were calculated with high school dropout or not as the dependent variable.

Ethical Considerations

The approval of the Institutional Research Ethics Committee was obtained; the registration code was MF 22 00010.

Results

One hundred sixteen adolescents who had studied middle school from 2017 to 2021 were located; 114 were accepted for eligibility, only two were not interviewed due to the absence of parents to give their consent; 29 were not reachable at the time of the interview due to work or change of address; 20 of them could not be reached either by phone or social networks. Only nine were contacted later by phone. Finally, 82 adolescents who finished middle school and 12 who had interrupted middle school in the first, second or third year were interviewed (See Figure 1 STROBE Flow chart).

The majority of those who finished middle school remain single (86.4%) while 50% of those who dropped out of school have a partner or are married ($p=.007$); 63% of those who finished school are studying for a career, against 16.5% of those who interrupted their studies ($p=.004$). No statistical significance was found in the comparison between both groups regarding occupation, living arrangements, the highest level of education of the father or mother, age and current job (See Table 1).

Academic Background

The reasons for dropping out of high school were due to pregnancy or because they did not like studying, a percentage due to illness

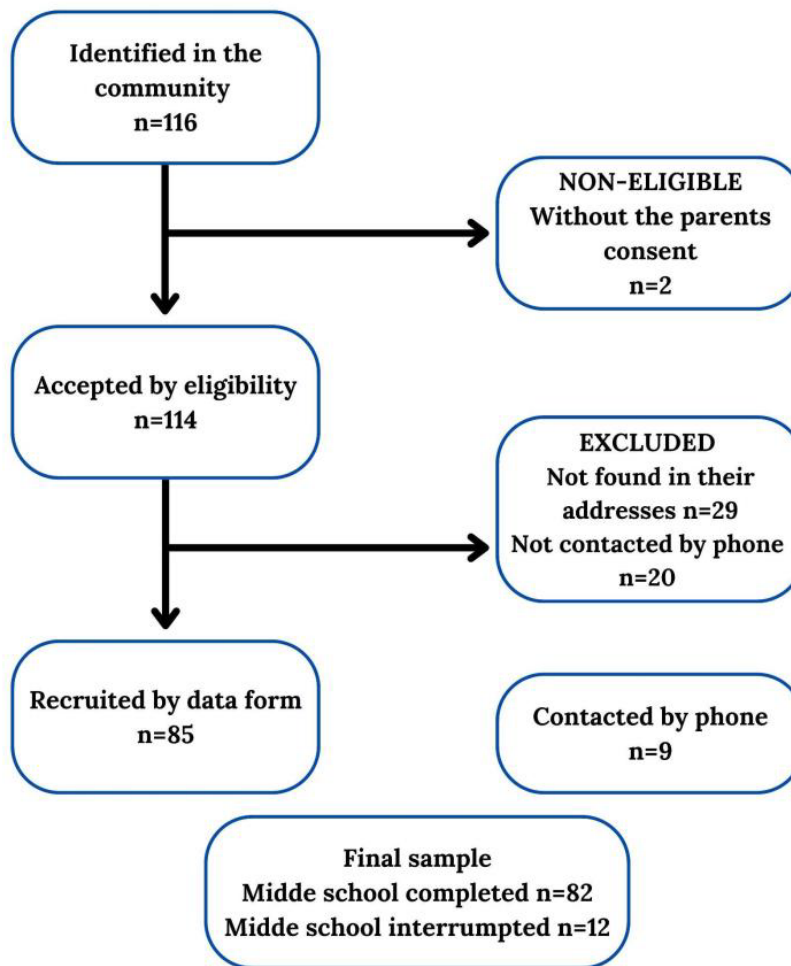


Figure 1: STROBE Flow chart.

Table 1:

| Variables | Discontinued Secondary School (NO) | | Discontinued Secondary School (SI) | | Value of p |
|---|------------------------------------|------|------------------------------------|------|------------|
| | Fx | % | Fx | % | |
| Marital Single status n=93 | | | | | .007 |
| Single | 70 | 92.1 | 6 | 7.9 | |
| Other | 11 | 64.7 | 6 | 35.3 | |
| Religion | | | | | .766 |
| Catholic | 43 | 53.2 | 8 | 66.7 | |
| Jehovah's Witness | 3 | 3.7 | 0 | 0.0 | |
| Other | 8 | 9.8 | 1 | 8.3 | |
| None | 27 | 33.3 | 3 | 25.0 | |
| Occupation n=94 | | | | | .491 |
| General assistant | 2 | 2.4 | 0 | 0 | |
| Cook | 1 | 1.2 | 0 | 0 | |
| Stylist | 1 | 1.2 | 0 | 0 | |
| Other | 8 | 9.6 | 2 | 16.7 | |
| With whom does she live? n=93 | | | | | .075 |
| Mother and Father | 11.0 | 13.6 | 1 | 8.3 | |
| Partner | 2 | 2.9 | 3 | 25 | |

| | | | | | |
|--|-------------|-----------|-------------|-----------|------|
| Mother, Father and siblings | 39 | 48.1 | 2 | 16.7 | |
| Mother and siblings | 7 | 8.6 | 2 | 19.7 | |
| Others | 22 | 27.1 | 4 | 33.3 | |
| Mother's highest education n=93 | | | | | .358 |
| Primary education completed | 6 | 7.4 | 1 | 8.3 | |
| High School Completed | 35.0 | 43.2 | 8 | 66.7 | |
| Technical degree | 23 | 28.4 | 2 | 16.7 | |
| Professional | 4 | 4.9 | 0 | 0 | |
| Other | 13.0 | 16.0 | 1.0 | 8.3 | |
| Father's highest education n=91 | | | | | .565 |
| Primary education incomplete | 5 | 6.3 | 1 | 8.3 | |
| Primary education completed | 6 | 7.6 | 3 | 25.0 | |
| Secondary education incomplete | 4 | 5.1 | 1 | 8.3 | |
| Secondary education completed | 32 | 40.4 | 4 | 33.4 | |
| High School/technical | 18 | 22.8 | 2 | 16.7 | |
| Professional | 7 | 8.9 | 0 | 0.0 | |
| Unknown | 7 | 8.9 | 1 | 8.3 | |
| Adolescent currently Studying n=93 | | | | | .004 |
| YES | 51 | 63 | 2 | 16.7 | |
| NO | 30 | 37 | 10 | 83.3 | |
| Numeric variables | Mean | SD | Mean | SD | |
| Age | 16.5 | 2.1 | 17.1 | 1.5 | .221 |

SD = Standard deviation

Table 2:

| Variables | Discontinued Secondary School (NO) | | Discontinued Secondary School (SI) | | Value of p |
|---|------------------------------------|------|------------------------------------|-----------|------------|
| | Fx | % | Fx | % | |
| Fail any subject n=92 | | | | | .353 |
| YES | 13 | 16 | 0 | 0 | |
| NO | 68 | 84 | 11 | 100 | |
| Absence of classes n=93 | | | | | .274 |
| Frequently | 6 | 7.4 | 2 | 16.7 | |
| Almost always | 1 | 1.2 | 1 | 8.3 | |
| Seldom | 45 | 55.6 | 4 | 41.7 | |
| Never | 29 | 35.8 | 4 | 33.3 | |
| School grades n=93 | | | | | .066 |
| Very good | 13 | 16 | 2 | 16.7 | |
| Good | 34 | 42 | 1 | 8.3 | |
| Average | 33 | 40.8 | 8 | 66.7 | |
| Poor | 1 | 1.2 | 1 | 8.3 | |
| Difficulty learning a subject n=93 | | | | | .075 |
| No | 36 | 44.4 | 7 | 58.4 | |
| Yes, a little | 40 | 49.4 | 4 | 33.3 | |
| Yes, a lot | 5 | 6.2 | 1 | 8.3 | |
| Currently studying n=93 | | | | | .004 |
| Yes | 51 | 63 | 2 | 16.6 | |
| No | 30 | 37 | 10 | 83.4 | |
| Reason for interrupting studies n= 10 | | | | | |
| Owen illness | -- | -- | 2 | 20 | |
| Did not like studying | -- | -- | 3 | 30 | |
| Family conflicts | -- | -- | 1 | 10 | |
| Could not take virtual classes | --- | --- | 1 | 10 | |
| Pregnancy | -- | -- | 3 | 30 | |

Table 3:

| Variables | Discontinued Secondary School (NO) | | Discontinued Secondary School (SI) | | Value of p |
|--|------------------------------------|------|------------------------------------|------|------------|
| | Fx | % | Fx | % | |
| Current sexual relations n=93 | | | | | .001 |
| Yes | 25 | 30.9 | 10 | 63.3 | |
| No | 56 | 69.1 | 2 | 16.6 | |
| Sexual relations in High school n=35 | | | | | .020 |
| Yes | 6 | 46.2 | 7 | 53.8 | |
| No | 19 | 86.4 | 3 | 13.8 | |
| Current pregnancy n=35 | | | | | .010 |
| Yes | 0 | 0 | 3 | 100 | |
| No | 25 | 78.1 | 7 | 21.9 | |
| Use of contraceptives n=79 | | | | | .004 |
| Yes | 16 | 76.2 | 5 | 23.8 | |
| No | 10 | 66.7 | 5 | 33.3 | |
| No applicable | 55 | 100 | 0 | 0 | |
| Currently studying | | | | | .004 |
| Yes | 51 | 96.2 | 2 | 3.8 | |
| No | 30 | 75 | 10 | 25 | |
| Smokes cigarettes n=93 | | | | | |
| Yes | 6.0 | 7.4 | 1.0 | 8.3 | |
| No | 75.0 | 92.6 | 11.0 | 91.7 | |
| Smoked in High School n=8 | | | | | .1000 |
| Yes | 1 | 14.3 | 0 | 0 | |
| No | 6 | 85.7 | 1 | 100 | |
| Consuming alcohol n=93 | | | | | .282 |
| Yes | 21 | 25.9 | 1 | 8.3 | |
| No | 60 | 74.1 | 11 | 91.7 | |
| Condom use n=80 | | | | | .025 |
| Always and almost always | 11 | 15.9 | 2 | 18.2 | |
| Sometimes | 3 | 4.3 | 0 | 0 | |
| Never | 9 | 13 | 3 | 27.3 | |
| No applicable | 46 | 66.7 | 3 | 27.3 | |
| Drank alcohol since High school n=93 | | | | | .630 |
| Yes | 9 | 81.8 | 2 | 18.2 | |
| No | 72 | 87.8 | 10 | 12.2 | |

Table 4:

| Variable | Odds ratios (ORs) | Confidence Interval 95% |
|--|-------------------|-------------------------|
| Current sexual relationships | 11.2 | 2.2 – 54.9 |
| Started sexual relations in high school | 3.9 | 1.2 – 12.6 |
| Not currently studying | 2.2 | 1.5 – 3.3 |
| Current pregnancy | 4.5 | 2.3 – 8.7 |

and a smaller percentage due to family conflicts or because they could not take online classes. There was no statistical difference in academic aspects that could influence dropping out of school, failed subjects, absences from school or bad grades (Table 2).

Schoolchildren who interrupted high school more frequently have sexual relations (SR) currently, use fewer contraceptives and

consequently more pregnancies, and had more frequent SR during their time in high school in a statistically significant way (Table 3). Smoking was not very different in both groups; however, alcohol consumption was surprisingly more prominent in the group that completed school (95.5% vs. 4.5%), even from the time they were in high school this predominance was seen (Table 3).

In the area of sexuality, it was observed that there are 11 times more possibilities of having sexual relations currently in the group that dropped out of school, OR = 11.2 (CI95% 1.2 – 12.6); (p<.05), (Table 4) compared to the group that remained at school for three years. Likewise, among those who dropped out of school, there is a 4.5 times greater possibility of becoming pregnant while outside the educational environment (three current pregnancies) (Table 4).

Discussion

Twelve adolescents who dropped out of 116 found according to the inclusion criteria were documented, this is a higher percentage (10.3%) than that reported on official sites of 0.9% in high school students or 5.6% according to another national source [16,17]. Although this does not intend to represent the prevalence of school dropout, it gives us an estimate of its magnitude, at least in this type of population, and probably influenced by the COVID-19 pandemic.

Main results and comparison with literature

The academic impact of dropping out.

Outside the school environment, there are more chances of getting pregnant, as confirmed by the literature; 50% of 230 schoolchildren became pregnant after dropping out of school [18]. In another study in South Africa, dropping out of school was associated with a subsequent pregnancy almost four times more often (HR 3.58 [95% CI; 2.04 to 6.28] [19], which coincides with the results of the present investigation.

On the other hand, there is an impact on adolescence that affects the reduction of 20 years of schooling [20]. In the current study, 63.0% of those who finished high school continued studying against 16.7% of those who interrupted school, a large difference, statistically significant, with p=.004.

Reasons for dropping out

The reasons given by adolescents who dropped out of school are like those reported in the literature; pregnancy at school and lack of liking or interest in studying predominated [21]. But economic problems are described [22,23], or even now circumstantially because of the COVID-19 pandemic 5 or even sociocultural factors (expulsion from home, with pregnant sisters or mothers, and early pregnancy before the age of 15 [24].

Sexuality

The sexuality of the adolescent deserves a separate chapter, because sexual practices have changed drastically, and the association with unwanted pregnancy is unquestionable. It is a fundamental, independent factor on which well-structured comprehensive programs must be developed to modify or reduce the incidence of this public health problem. Unquestionably, there is more sexual activity among adolescents whether they are studying, and therefore, a greater risk of pregnancy. In this research, we found that there were 11.2 times more possibilities of having sexual relations among those who are outside the school environment (Population that interrupted secondary school (Table 4). However, the sexual practices of schoolchildren are doubly risky if we

consider that they would generate double the phenomenon of pregnancy in adolescents and this dropout very surely. There is a strong connection between starting sexual relations at school, the possibility of pregnancy and school dropout; in this current study, those who started sexual relations in secondary school showed almost four times more possibilities (OR = 3.9) of interrupting secondary school (Table 4).

Drug Addiction

Smoking was not very different in both groups, although its association with school dropout is not demonstrated [25]. There is no clear explanation of why alcohol intake was more prominent in the group that completed school (95.5% vs 4.5%). Even in secondary school, this predominance was seen (Table 3); perhaps this finding is related to alcohol consumption in adolescents (20.6%) with a prevalence of excessive consumption in adults, socioeconomic level and those without studies [26].

Academic Background

Contrary to the literature, which states that the risk of dropping out increases when subjects fail [27], no differences were found in the current research that constitutes warning signs to avoid dropping out. Without attempting to create a profile of the outstanding characteristics of the student who drops out of high school in our country, and with the limitations of the current study, it was possible to characterize the students who drop out of high school as having an average age of 17.1, SD 1.5; 50% with a partner or married, most do not work, 50% of those who interrupted their studies live with parents and siblings, and their parents had a lower level of education than them. However, it coincides with what the literature indicates as a profile of a pregnant adolescent. For example, Garza Reyna, reported in a study of 400 pregnant adolescents from three municipalities in the same region, an average age of 17.7 ± 1.65 years, predominantly from the lower-middle and lower socioeconomic stratum, with economic dependence on parents [22]. In another study of 230 pregnant adolescents interviewed, 80% were homemakers, and 13% were unemployed [18]. But in Brazil, for example, they applied a model tending to precisely characterize adolescents who drop out of high school. It was formed as white young women over 15 years old who had been pregnant at least once, who did not work, and whose family income was equal to or less than US\$780 per month. They are also very similar characteristics [23].

This panorama raises the urgent need to design successful multi-sector strategies to modulate or frame these practices in schoolchildren, with safe sex environments and sufficient information that is widely available on social networks, ensuring accessibility to contraceptives and sexual education for adolescents. Although some authors have pointed out the fact that male participation in the problem of unwanted teenage pregnancy has been ignored, recently, voices have been raised that point to the participation of men, such as CONEVAL 2022 [13]. More than half of teenage pregnancies have adolescent men as a partner [28]. Teenage pregnancy is generally conceived from a health perspective and, on the other hand, school failure as an educational aspect, but

both variables show a strong interconnection, often with a common background of social vulnerability and economic deficiencies. One of the few studies dealing with this interrelationship in 2 533 adolescent schoolchildren aged 13 to 20 years from a rural school in South Africa, in both directions school dropout associated with a subsequent pregnancy and pregnancy associated with subsequent school dropout [HR 2.36; 95% CI (1.29 – 4.31)] [19].

Limitations

Few longitudinal studies exist in Mexico, and they are more of a community nature due to the difficulties involved in geographical accessibility, the investment of time, resources, and necessary organizational links. However, the sample obtained was small, especially of adolescents who had dropped out of secondary school, and their location was difficult due to distance, time, and sometimes insecurity. This situation led to difficulties in statistical estimates, which were nevertheless carefully carried out and double checked.

Guidelines for future research. It is necessary to carry out a similar study on a larger scale at the municipal or state levels, including identifying those who have dropped out of high school and implementing a school reintegration program, combating the multiple causes recognized as causing dropouts. Given the high frequency of sexual activity in schools, prospective or, better yet, predictive studies are needed to help identify schoolchildren at risk of becoming pregnant.

Conclusion

Of 116 adolescents, only 94 (10.3%) were surveyed in four neighborhoods of a municipality in Nuevo León; 12 had interrupted their secondary studies for various reasons, mainly pregnancy or lack of interest in studying. Dropout impacts the educational field: a lower percentage of studies, and there is a greater exercise of sexuality with the risk of unwanted pregnancy. This group that dropped out reported greater sexual activity, more pregnancies and less use of contraception, although without statistical significance.

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