RESEARCH ARTICLE

Linking suicide attempts with educational attainment among Filipinos 15 to 24 years old: A cross-sectional study

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ABSTRACT

Background: The burden of suicide increases globally in persons with ages 15-19 years as they are more vulnerable to risky behaviors. The Young Adult Fertility and Sexuality Study of 2013 (YAFS4) suggests further analysis and accounting for other related variables to determine if a true relationship between educational attainment and suicide is reflected.

Methodology: An analytic cross-sectional study was employed using secondary data from the YAFS4. The proportion of suicide attempt among the different education levels and its confounders was determined using point and interval estimates, whereas the association between educational attainment and suicide attempt was determined through multiple logistic regression analysis.

Result: Results revealed a high prevalence of suicide attempt among those with 'No schooling/Elementary' (38.36%), who have used alcohol (36.15%) and drugs (50.82%), and identified as 'bisexual' or with an 'identity crisis' (52.00%). Overall, there was an association between educational attainment and suicide attempt. The odds of suicide attempt was 1.69 times higher among those with “No schooling/Elementary” as compared to those “College Graduates or Higher”, and was the only group found to be statistically significant even after controlling for socioeconomic status.

Conclusion: An association exists between educational attainment and suicide attempt, wherein having a lower level of education has higher odds of suicide attempt. The study suggests that interventions start as early as elementary school and focus on the out-of-school youth. Additionally, future research may also look further into the confounding effects of socioeconomic status and the mechanisms involved.

Keywords: *educational attainment, suicide attempt, adolescents*

Introduction

Suicide is a major public health problem that is considered to be one of the leading causes of death worldwide [1]. According to the World Health Organization (WHO), suicide is the cause of death of about 800,000 people each year [2]. In 2016 alone, over 212,725 casualties were recorded involving people with ages 15-29 years old [3]. In fact, suicide is the second leading cause of death in the aforementioned age group. While being a global phenomenon, 79% of global suicides occur in middle and low-income countries. In 2012, the Philippines was among the top five countries in the Western Pacific Region to have an increased rate of suicide [4]. The latest available data on suicide in the Philippines tallied a total of 762 deaths among males and females within the 15 to 24 age bracket in 2011 [5]. It has been difficult to measure suicide prevalence in the country since no country-wide registry is in place [6].

The WHO launched the Mental Health Gap Action Programme (mhGAP) to provide a comprehensive suicide prevention strategy that is multisectoral and encompasses other factors such as mental, neurological, and substance use disorders [7]. Multiple studies on suicide have already delved into different risk factors that may contribute to suicide ideation and attempt; however, it must be taken into consideration that there may be a possible interaction of these risk factors in order to develop preventive strategies

that effectively address suicide. Furthermore, most of these are not centered on the Philippine demographic.

Some studies looked into the confounding variables between suicide attempt and educational attainment. Studies by Kosik *et al*. (p<0.01) and Rosoff *et al*. (CI: 0.206, 0.568) both showed that socioeconomic status confounded the association between suicide attempt and educational attainment [8,9]. Moreover, Rosoff *et al.*'s study found an association between the effects of genetic variants and increased educational attainment (CI: 0.3890, 0.642), after adjusting for alcohol consumption and smoking behaviors.

The global burden of suicide reveals an increasing concern within the age group of 15-19 years old as they are more vulnerable to risky behaviors such as smoking, drinking, drug use, and also violence, which may eventually lead to observing risky sexual behaviors [10]. However, it has been difficult to measure suicide prevalence in the country since no country-wide registry is in place [5]. According to the 2013 Young Adult Fertility and Sexuality study, most of these behaviors are commonly found among those with higher educational levels, who exhibit increased levels of suicide ideation as well [10]. The possible association of education to suicide remains unclear as recent studies have shown a disparity in their results. Hence, a study focused on the Philippine youth demographic may shed light on the role that education plays on suicide ideation. This study aimed to determine the association between educational attainment and suicide attempt among adolescents in the Philippines.

Methodology

Study Design and Period

The Young Adult Fertility and Sexuality (YAFS) study conducted by the University of the Philippines Population Institute (UPPI) and Demographic Research and Development Foundation (DRDF) is a series of national surveys focused on the Filipino youth [10]. The study employed a quantitative, analytic, cross-sectional design on the secondary data provided by the YAFS 4 study which was conducted from December 2012 to May 2013. It included all 17 regions and provinces in the Philippines except for Batanes, Siquijor, and Dinagat.

Target Population

The target population involved all Filipino youth aged 15-24 years old. The study population included all YAFS 2013 respondents consisting of Filipino young adults between 15 to 24 years old. It encompassed a total of 19,178 participants wherein 9,353 were males and 9,825 were females. A total sample size of 1,738 was utilized in the study after exclusions of missing data on major study variables.

Study Variables

The dependent variable, suicide attempt, corresponds to having ever had at least one self-reported instance of slashing of wrist, hanging of self, or ingesting substances. The independent variable, educational attainment, pertains to the highest level of education that has been completed by the individual.

Confounding variables were determined from previous research and its availability in the YAFS 4 data set. Sexual behavior denotes any engagement in casual sex. Casual sex pertains to one or more instances of sexual activity wherein no romantic affiliations or payment was involved. Drug use and alcohol use corresponds to having tried using drugs or alcohol, respectively. Experience of violence corresponds to having experienced being hit, slapped, or physically hurt by someone. Sexual orientation refers to the individual's capacity of having emotional, affectional, sexual, and any form of relations with another individual who may be of the same, opposite, or different gender. Socioeconomic status was measured by means of computing for the socioeconomic status index which includes amenities owned by the members of the household, tenure status on the lot, and housing conditions. It was categorized into five according to wealth quintile. The first quintile corresponded to 'lowest' or the poorest, the 'second quintile', the 'middle quintile', the 'fourth quintile', and 'fifth quintile' representing the 'highest' or the richest among the five.

Inclusion and Exclusion Criteria

The study included all YAFS 2014 respondents consisting of Filipino young adults between 15 to 24 years of age. Excluded in the study were participants with missing data on the major variables which were indicated as “NI” or “NA” on the dataset. From the initial 19,178 observations from the YAFS4, only 1,738 observations were included after adjusting for Not applicable (NA) or No Information (NI) responses for suicide attempt. This was the dataset used in the analysis of the final model. Further reductions were done to account for variables that had missing or NA/NI responses in the full model: sexual orientation with 1 observation experience of violence with 1 observation and sexual behavior with 789 observations. Only 948 observations remained which were used for the analysis of the full model.

Data Collection

Data collected was based on the raw and de-identified data obtained in the 2013 Young Adult Fertility and Sexuality Study through the Philippine Population Data Archive (PopArchive). Initially, the UPPI was contacted through email, UPPI then referred the researchers to the PopArchive. PopArchive is a system for data management that allows researchers to access datasets and conduct secondary analysis. A request form was submitted to PopArchive to be able to obtain anonymized or de-identified data from YAFS 2013.

Processing and Analysis

A coding manual was prepared for the recoding of variables obtained from the PopArchive. These were screened and processed to check for inconsistencies and incompleteness of data prior to the actual analysis. The requested data were processed and analyzed in a statistical software, Stata/IC version 16.1. For the descriptive statistics, measures such as absolute and relative frequency were used in summarizing the socio-demographic characteristics of the study population. For inferential statistics, logistic regression was used to determine an association between the dependent and independent variables. The regression model consisting of only the outcome, exposure, and significant confounding variables would serve as the final model for analysis. A crude analysis was done first to check if there was a plausible association between the exposure and outcome variables. This would be considered as the unadjusted OR since confounding variables were not yet accounted for in the logistic regression. Afterwards, probable confounders were evaluated through individual logistic regressions with suicide attempt. Confounders that had a p-value of less than 0.25 would then be included in the full model. A 5% level of significance was used in the analysis. Furthermore, probable confounders were arranged from highest to lowest p-value. Each variable was removed one by one to determine the percent change that occurred after its removal from the estimate in the full model versus the estimate in the reduced model. A 10% change or more would entail the decision to retain the variable in the final logistic regression model for analysis. With this, only socioeconomic status was found to be a significant confounding variable and added to the final model for analysis.

Ethical Considerations

This research was subjected to ethics review by the University of the Philippines Manila Research Ethics Board (UPMREB) and has been approved by the said committee.

Results

From the 19,178 YAFS4 respondents, only 1,738 (9.06%) had information that could be used to answer the objectives of this study. Of these, only 948 were used to run the full model of the logistical regression analysis. Based on the number of observations, approximately a third of the remaining participants tried to commit suicide. In terms of educational attainment, more than half of the eligible study participants (52.30%) completed at least high school or a vocational course. Moreover, roughly a quarter of the remaining participants completed primary school. Among the study participants, approximately three out of four (75%) were females. For age, the respondents were clustered into two categories based on the YAFS4, wherein around half of the respondents (52%) were between ages 15-19, and the remaining (48%) between ages 20-24.

Based on the demographic of the study participants, the socioeconomic status of approximately one out of six (16%) belonged to the 'wealthiest' quintile (Table 1). Moreover, 17.50% of the study population belonged to the 4th quintile. Both the 2nd and 'Poorest' quintile each comprised almost a quarter of the population (23%). Of the eligible participants, a majority responded to having tried alcohol (79%).

From the remaining participants, more than half (59%) experienced being hurt by another person. Most of the study population responded to not having experienced using drugs (93%) in their lifetime and answered not having engaged in casual sex (88%). Majority of the participants (94%) identified as straight/heterosexual, while the remaining identified as LGBT or undergoing an identity crisis.

The prevalence of suicide attempt was determined among the different identified variables (Table 2). Among the categories, more than a third (38%; 95%CI: 32.15, 44.97) of those with no schooling or did not finish elementary school attempted suicide at least once. Furthermore, at least one in three participants who had ever tried alcohol had an attempt on their life (36.15%; 95% CI: 33.65, 38.72). More than half of those who had ever tried drugs (51%; 95% CI: 42.01, 59.58) and those who identified as bisexual or had an identity crisis (52%; CI: 38.34, 65.37) also attempted suicide. No significant statistical values or patterns were observed from the following variables; socioeconomic status, sexual behavior, and experience of violence.

There was an association found between educational attainment and suicide attempt (p-value: 0.02) (Table 3). It was

Table 1. *Demographic Characteristics (n=1,738, unless otherwise specified)*

Demographic Characteristic	Frequency	Percentage
Suicide Attempt		
Without	1,151	66.23
With	587	33.77
Educational Attainment		
College or Higher	402	23.13
High school graduate/Vocational	507	29.17
High school undergraduate	610	35.1
No schooling/Elementary	219	12.6
Sex		
Male	437	25.14
Female	1,301	74.86
Age		
20-24	838	48.22
15-19	900	51.78
Socioeconomic Status		
Highest (Wealthiest)	277	15.94
4th	304	17.49
Middle	367	21.12
2nd	395	22.73
Lowest (Poorest)	395	22.73
Alcohol Use		
No	363	20.89
Yes	1,375	79.11
Experience of Violence (n=1,737)		
No	831	87.57
Yes	118	12.43
Drug Use		
No	1,616	92.98
Yes	122	7.02
Sexual Orientation (n=1,737)		
Straight/Heterosexual	1,635	94.13
Lesbian/Gay	52	2.99
Bisexual/Identity crisis	50	2.88
Socioeconomic Status		
Highest (Wealthiest)	277	15.94
4th	304	17.49
Middle	367	21.12
2nd	395	22.73
Lowest (Poorest)	395	22.73

observed that more than a third of those having 'No schooling/ Elementary' (38.36%) attempted suicide at least once. In addition, the odds of suicide attempt was 1.69 times higher among those with no schooling or elementary schooling compared to college graduates or higher, and was statistically significant even after controlling for socioeconomic status (95%CI: 1.11, 2.32). The estimated risk of suicide attempt was 1.28 times more among those who are high school undergraduates compared to college graduates or higher, even after controlling for socioeconomic status (95%CI: 0.97, 1.70). Lastly, the odds of suicide attempt was 1.06 times higher among those who are high school graduates or with vocational courses compared to college graduates or higher after adjusting for socioeconomic status (95%CI: 0.80, 1.42). However, the odds of suicide attempt among the last two groups were not statistically significant.

Table 2. *Prevalence of Suicide Attempts among Categories of the Possible Confounders (n=1,738, unless otherwise specified)*

Variables	Suicide Attempt	
	No.	%(95%CI)
Educational Attainment		
College or Higher	130	32.34 (27.94, 37.07)
High school graduate/Vocational	161	31.76 (27.85, 35.94)
Highschool undergraduate	212	34.75 (31.07, 38.63)
No schooling/Elementary	84	38.36 (32.15, 44.97)
Alcohol Use		
No	90	24.79 (20.62, 29.50)
Yes	497	36.15 (33.65, 38.72)
Drug Use		
No	525	32.49 (30.25, 34.81)
Yes	62	50.82 (42.01, 59.58)
Sexual Orientation (n=1,737)		
Straight/Heterosexual	540	33.03 (30.79, 35.35)
Lesbian/Gay	21	40.38 (28.01, 54.11)
Bisexual/Identity crisis	26	52.00 (38.34, 65.37)
Socioeconomic Status		
Highest (Wealthiest)	104	37.55 (32.03, 43.40)
4th	120	39.47 (34.13, 45.08)
Middle	114	31.06 (26.53, 35.99)
2nd	122	30.89 (26.52, 35.62)
Lowest (Poorest)	127	32.15 (27.73, 36.92)
Sexual Behavior (n=949)		
No	311	37.42 (34.19, 40.77)
Yes	52	44.07 (35.38, 53.13)
Experience of Violence (n=1,737)		
No	218	30.70 (27.42, 34.20)
Yes	368	35.83 (32.95, 38.82)

Discussion

The finding of this study of a high prevalence and association between suicide attempt among those with 'No schooling/elementary' as their highest educational attainment is congruent with previous studies. However, mechanisms explaining this outcome can be further investigated. Moreover, these findings suggest the importance of prioritizing vulnerable populations such as out-of-school youth. Preventive and promotive health strategies and interventions can be used as an approach to lessen the prevalence of suicide attempt among this population. Furthermore, existing programs may be strengthened and reinforced in line with the findings of the study.

The proportion of suicide attempt were the determined among categories of different variables used in the study. Results show that suicide attempt was prevalent among those who had tried alcohol, drugs, or other substances. Several studies find that alcohol consumption is a risk factor contributing to youth suicides [11-13]. It is theorized that it may influence unplanned suicides due to various mechanisms like increased disinhibition, impulsiveness, aggression, negative affectivity, and increased cognitive constriction, that decreases production of alternative coping strategies [11-14]. Another study found a significant association between suicide attempt and those who initiated alcohol use at or after the age 13 (OR=2.88, 95% CI: 1.95, 4.94) [11]. This suggests that an early initiation to alcohol drinking may make them more susceptible to suicide attempt and ideation. Susceptibility to suicidal behaviors may be influenced by association to other health factors like depression and adverse life events [11,13].

Similar to alcohol use, drug use was also found to cause disinhibition through its negative effects on judgment, impulse control, and neurotransmitter pathways which may lead to suicidal behavior [15,16]. Similarly, a study by Wong *et al.* found that a history of substance use was an important

risk factor for suicide ideation, plans, and attempts [17]. A few of the mechanisms linking suicide attempt and drug use are brought by relational problems between family and peers [17] and hindrance in daily activities like failure to attend school [16]. It may also contribute to unhealthy coping strategies such as considering alcohol and drug use as effective means in combating depression [17]. However, it is noteworthy that individuals may have different risks to suicide that is further influenced by mental disorders and greater exposure to environmental stress [17].

For sexual orientation, a high prevalence of suicide attempt was seen among those who identify as bisexual or have an identity crisis (52%). Results are aligned with other studies wherein higher prevalence of suicide attempt is related to a higher incidence of various mental disorders like depression, anxiety, and substance abuse among the LGBT youth [18,19]. Furthermore, a study by Haas and Jack found an almost four-fold risk on gay or bisexual men and twice among lesbian or bisexual women [18]. These are often rooted in discrimination, bullying, harassment, exclusion, and violence. Similarly, societal norms on gender and sexuality are also contributing factors. They may induce emotions of shame among the LGBT youth and discourage them from speaking on matters regarding distress, self-harm, sexual orientation, or gender identity [20]. It was found that those disclosing their orientation to their families are more likely experience rejection which is linked to higher rates of depression, leading to other risky behaviors like running away and homelessness [19]. Notably, transgenders who do not disclose their status have less risk for suicide as it prevents rejection and discrimination [18]. These findings suggest that violence and stigma towards the LGBT community are two of the strongest contributing factors that may ultimately lead to suicide.

Findings revealed that 35.83% of the study population for experience of violence (n=1,737) is exclusive for those who had experienced physical forms of violence. Thus, it suggests that the estimate of prevalence can be higher if other forms of violence (e.g. emotional, verbal) have been included in the study population. Furthermore, it is mentioned by Sofuoglu *et al.* and Fry *et al.* that among those who dropped out of school, violence of different forms are common [21,22].

Results found that those with low levels of education had high proportions of suicide attempt, and therefore contributed to previous studies with the same conclusion [23-30]. Less education is found to be connected to higher chances of alcohol and drug abuse, adverse childhood experiences, diminished opportunities, and interpersonal issues which may have an overall contribution to the attempt on their own life [23]. Contrasting findings state that higher education may have a predisposition to mental illness and may also result in suicide. This is mainly because of the pressures surrounding those with high educational attainment to have better quality of life and thus, setbacks or failures may have a psychological effect among them [27,31]. Differences from several studies may be due to the availability of data from the first [27,31] and third world [27] countries as there may be stigma and underreporting of suicide. Despite the numerous studies associating educational attainment and suicide (e.g. ideation, planning, and attempt), only statistical significance were presented, but the possible mechanisms explaining the relationship were not stated.

Crude analysis between suicide attempt and educational attainment has shown that the exposure did not have a significant impact on the outcome variable (p-value: 0.31). However, adjusting for socioeconomic status showed that there was an association between suicide attempt and educational attainment (p-value: 0.02). Those who had no schooling or elementary education were found to be 1.68 times more likely to attempt suicide compared to those who had a college degree or higher. However, only a limited number of studies reported an indirect association between educational attainment and suicide while controlling for socioeconomic status [25,26]. According to a study, an explanation for this was that education is an important health indicator and is attributed to success and enhancing one's socioeconomic situation [26]. Moreover, it is common among those living in poorer neighborhoods to attend schools with disadvantaged and/or low achieving students, which may influence the risk of underperformance on an individual level [32]. Low parental socioeconomic status, low intelligence or IQ, and poor school performance are factors that can increase the risk of suicidal behavior among the youth [32]. Furthermore, those with lower levels of education and intelligence may have diminished opportunities in getting jobs. Thus, resulting in lower income and status, decreased problem-solving abilities, and antisocial tendencies. These may consequently lead to mental illnesses and ultimately, suicide [27].

Limitations of the Study

As a result of data reduction due to the exclusion of entries with incomplete data, the statistical power of the study was likely to have been affected. Results might have also been

Table 3. *Association between Educational Attainment and Suicide Attempts*

Number of observations for Crude OR = 1,738, Adjusted OR = 948 Prob>chi2 = 0.0157						
Category of educational attainment	**Suicide Attempt**		**Odds Ratio**			
	With		**Crude OR (95% CI)**	**p-value**	**Adjusted OR (95% CI)***	**p-value**
	No.	**%(95%CI)**				
College graduate or Higher	402	32.34 (27.94, 37.07)	*Referent*		*Referent*	
High school graduate/Vocational	507	31.76 (27.85, 35.94)	0.9735883 (0.735513, 1.288724)	0.852	1.064086 (0.7982954, 1.418371)	0.672
High school undergraduate	610	34.75 (31.07, 38.63)	1.114496 (0.8530906, 1.456)	0.427	1.280587 (0.9666649, 1.696454)	0.085
No schooling/ Elementary**	219	38.36 (32.15, 45.00)	1.30188 (0.9235806, 1.835132)	0.132	1.686483 (1.107934, 2.324566)	0.012

*adjusted for socioeconomic status
**statistically significant

affected by a possible difference in the characteristics between participants who were retained and the participants who were excluded from analysis. Furthermore, this limited how the remaining data were analyzed and interpreted. With the absence of information on these characteristics of the non-eligible participants because of the missing data, the direction of the possible bias could not be determined.

Conclusion

Suicide attempt was found to have a high prevalence among those with 'No schooling/Elementary' (38.36%; 95%CI: 32.15, 44.97). Moreover, there was an association found between educational attainment and suicide attempt (chi-square test p-value: 0.0157). The study suggests that those who have lower levels of education have higher odds of attempting suicide. With this, the interventions to be carried out may be centered towards the out-of-school youth or as early as those in elementary school. Furthermore, the study also found that socioeconomic status is a significant confounder between educational attainment and suicide attempts. Hence, this may also be grounds for future studies to look into its mechanism and subsequent contribution to educational attainment and suicide attempt.

Recommendations

For policymakers and program managers, there may be a need for interventions that are targeted towards those who are unable to attend or finish school. Furthermore, interventions can start as early as preschool since there are higher odds for suicide attempt among those whose highest level of education is 'No schooling/elementary'. The study's beneficiaries may include government institutions like the Department of Education (DepEd) and Department of Social Welfare and Development (DSWD), and non-profit organizations (NGOs) such as Childhope Philippines Foundation, Inc. and Save the Children Philippines. The DepEd and DSWD have programs directed towards out-of-school youth but are focused on providing livelihood and alternative education. Additionally, existing mental health programs of DepEd that are accessible online do not encompass the out-of-school youth since they are targeted only towards elementary students and onwards [33]. Essentially, findings of this study aim to redirect the emphasis of programs towards the out-of-school youth into providing health education which incorporates mental health initiatives. Another recommendation is to look into alternative delivery modes which will specifically cater to those unable to attend school. These include Enhanced Instructional Management for Parents, Community and Teachers, Modified In-School/Off-School approach, and establishment of the Open High School Program (OHSP) [34]. They may tackle vital topics like mental health awareness and sex education which may equip them with skills that will allow for future employment. Lastly, insufficient data on the number of suicide attempt cases in the Philippines given the extent of this research implies a need for surveillance that will be beneficial to effectively create interventions.

For future studies, researchers may delve into the different risk factors for suicide attempt. Moreover, future

research may consider using different study designs (e.g. cohort study) to establish a temporal relationship and causality between the variables. They may also consider utilizing a qualitative study design to collect more data on the mechanisms behind suicide attempt, specifically on socioeconomic status since it has a significant confounding effect between educational attainment and suicide attempt. Lastly, should other studies utilize the YAFS4 data set, other variables may be controlled to strengthen the association between the exposure and outcome.

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