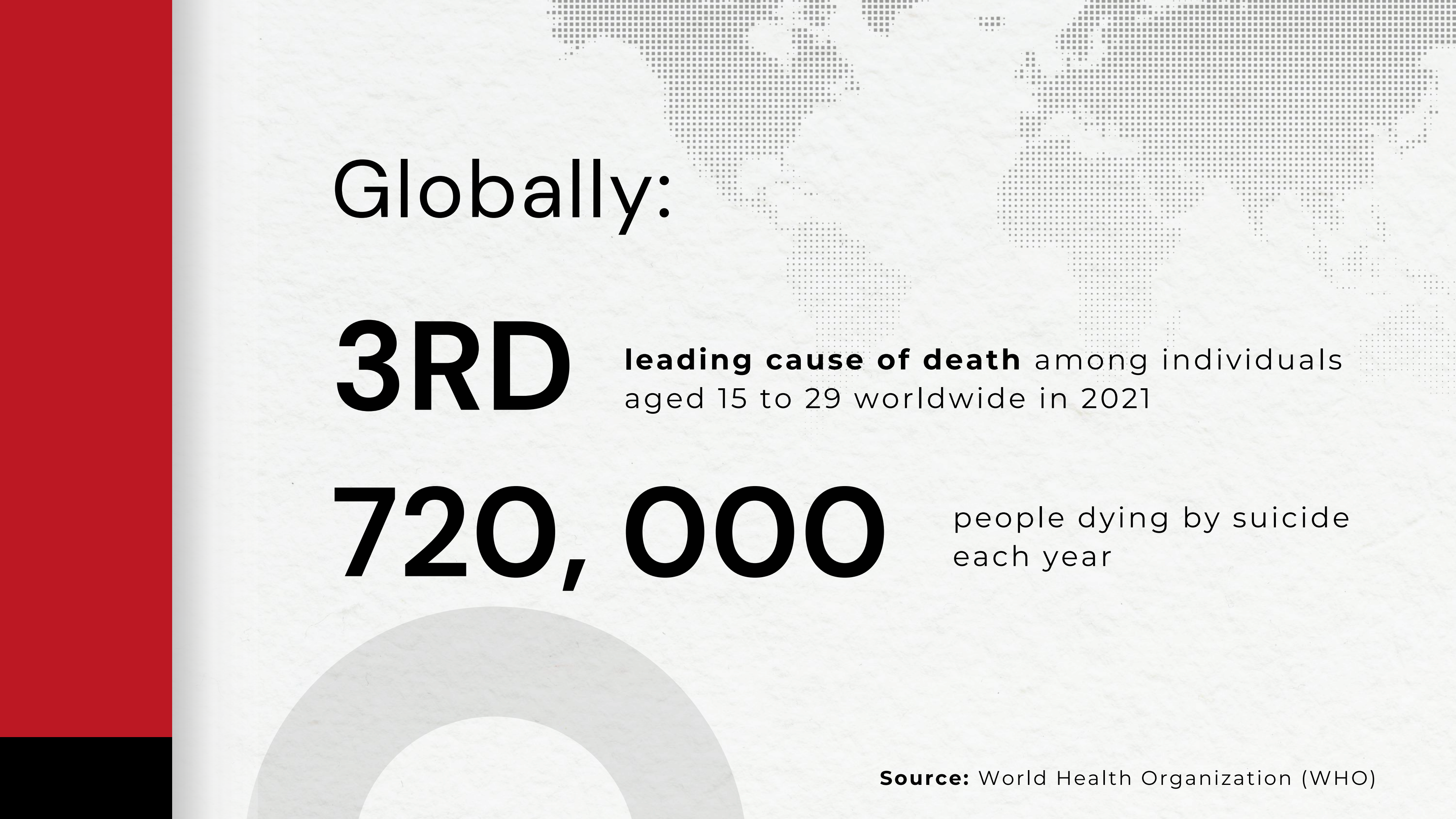




Trends of Suicidal Ideation among Filipino Adolescents: *Evidence from Five National GSHS Surveys, 2003–2019*

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Globally:

3RD

leading cause of death among individuals
aged 15 to 29 worldwide in 2021

720,000

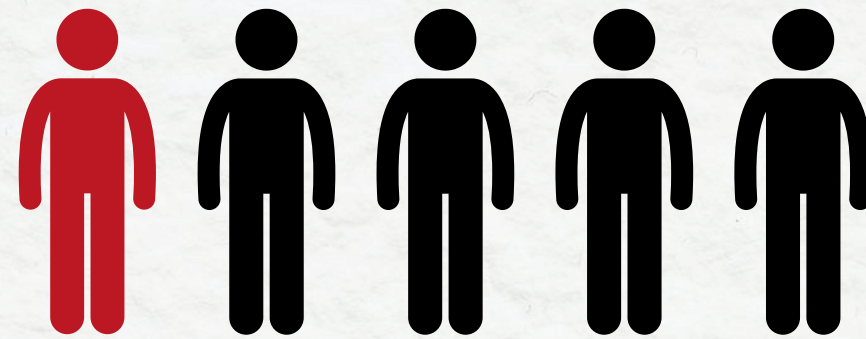
people dying by suicide
each year

Source: World Health Organization (WHO)

In the Philippines:

1.5 M

Filipino youths had
attempted suicide in 2021



Aged between 15 to 25 years
old have **considered**
ending their life

FACTORS:

Social, Cultural, Biological,
Environment, Psychological

Methodology

Study Design

 **World Health Organization**

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Philippines, 2019 [GET MICRODATA](#)

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STUDY POPULATION



37,221 adolescents

- **Filipino adolescents** aged 12–17 years from public and private secondary schools
- Data from 5 rounds of the Philippine GSHS: 2003 (7,338), 2007 (5,657), 2011 (5,290), 2015 (8,761), 2019 (10,175)

DATA PREPARATION

- Combined 5 survey years into 1 dataset
- Variable names and codes were standardized
- Created categories: Age groups (≤ 14 , 15+), Bullying (1 if bullied), Suicidal ideation (1 if considered suicide)
- Added risk factors: loneliness, parental understanding, hunger, alcohol use
- Used weights, strata, and primary sampling unit (PSU) for national estimates

STATISTICAL ANALYSIS

Analysis performed using SAS OnDemand, incorporating the **complex survey design of the GSH Survey**



Weighted prevalence estimates using PROC SURVEYFREQ of suicidal ideation and related factors computed for each survey year (2003, 2007, 2011, 2015, 2019)

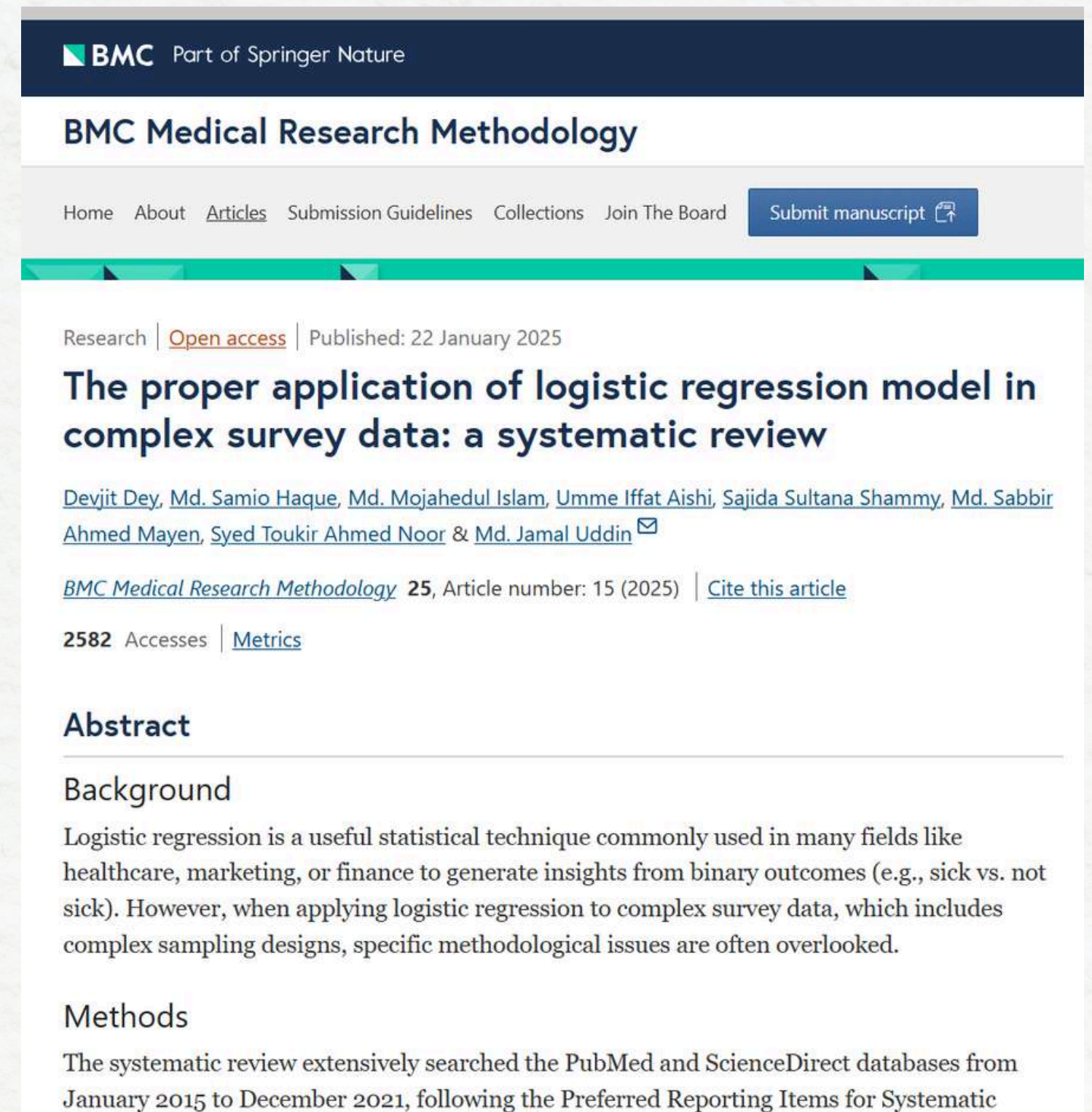
Bivariate Analysis

Cochran–Mantel–Haenszel (CMH) tests assessed associations between suicidal ideation and each predictor, adjusting for survey year

STATISTICAL ANALYSIS

Multivariate Analysis

- **Survey-weighted logistic regression** modeled factors linked to suicidal ideation using PROC SURVEYLOGISTIC in SAS
- Used **pseudo maximum likelihood estimation** to incorporate sampling weights, stratification, and clustering
- Model selection guided by **Wald's test statistics** for reliable inference with weighted data



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The proper application of logistic regression model in complex survey data: a systematic review

[Devjit Dey](#), [Md. Samio Haque](#), [Md. Mojahedul Islam](#), [Umme Iffat Aishi](#), [Sajida Sultana Shammy](#), [Md. Sabbir Ahmed Mayen](#), [Syed Toukir Ahmed Noor](#) & [Md. Jamal Uddin](#) 

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Abstract

Background

Logistic regression is a useful statistical technique commonly used in many fields like healthcare, marketing, or finance to generate insights from binary outcomes (e.g., sick vs. not sick). However, when applying logistic regression to complex survey data, which includes complex sampling designs, specific methodological issues are often overlooked.

Methods

The systematic review extensively searched the PubMed and ScienceDirect databases from January 2015 to December 2021, following the Preferred Reporting Items for Systematic

STATISTICAL ANALYSIS

Handling Missing Data

- **Multiple imputation with fully conditional specification** generated five imputed datasets
- Results pooled using Rubin's rules to reflect imputation variability
- **Listwise deletion** models also run for comparison, but imputed results prioritized

Model Assessment

- Goodness-of-fit evaluated with **Archer-Lemeshow** F-adjusted test, adapted for complex survey data
- Model discrimination assessed by **concordance measures** (e.g., c-statistic, Somer's D)
- Checked multicollinearity with **Variance Inflation Factors** (VIF < 5 acceptable)
- Influence observations were checked using **DFBETAs**

RESULTS & DISCUSSION

01

Proportion of sampled Filipino adolescents by different psychosocial and behavioral characteristics across survey years

02

Prevalence of Suicidal Ideation by Sex per Year

03

Percentage of adolescents who reported suicidal ideation across survey years

04

Factors associated with suicidal ideation among adolescents (2019 GSH Survey)

05

Adjusted odds ratios of factors associated with suicidal ideation among Filipino adolescents (2019 GSH Survey)

Table 1. Proportion of sampled Filipino adolescents by different psychosocial and behavioral characteristics across survey years

Variable	2003	2007	2011	2015	2019
Sex					
Male	42.9	47	49.2	49.4	49.2
Female	56.4	52.7	50.2	50.5	50.1
Unidentified	0.7	0.3	0.6	0	0.7
Age Group					
≤ 14	43.4	30.9	47.7	49.7	65.3
15+	54.3	68	51.3	40.7	29.7
Unidentified	2.2	1.1	1	9.6	5
Bullied in the past 30 days					
Yes	31	36.3	45	46.6	41.4
No	56	43.2	49.4	49.1	55.6
Unidentified	13	20.6	5.6	4.3	3
Felt lonely for the past 30 days					
Never	20.7	6.4	7.7	8.7	10.2
Rarely	28.4	25.3	24.4	28.8	24.8
Sometimes	38	48.8	51.4	44.4	40.5
Most of the time	7.3	13.7	11.6	12.1	15.7
Always	2.9	4.7	3	3.6	8.3
Unidentified	2.8	1.3	1.9	2.4	0.6
Reported having their parents understand their problems in the past 30 days					
Yes	27.8	48	27.1	28.8	29.8
No	72.2	52	72.9	71.3	70.2

Table 1. (Cont.d)

Variable	2003	2007	2011	2015	2019
Most of the time or always went hungry in the past 30 days					
Yes	7.8	7.4	6.8	7.5	12.7
No	92.3	92.6	93.2	92.5	87.3
Drank at least once in the past 30 days					
0 days	68.5	68.2	75.1	77.3	72.7
1 or 2 days	16	13.9	16.1	15.7	15.7
3 to 5 days	3.1	2.9	3.9	3.8	4.3
6 to 9 days	1	1.3	0.3	0.7	1.8
10 to 19 days	0.7	0.7	0.2	0.4	1
20 to 29 days	0.3	0.5	0.1	0.1	0
All 30 days	0.2	0.4	0.1	0.2	0.5
Unidentified	10.3	12	0.3	1.9	3.6
Could not sleep					
Never	19.9	18.1	21.1	23.5	23.2
Rarely	30.2	34.8	31	35.6	31.7
Sometimes	35.3	33.3	36.5	29.9	28.8
Most of the time	11	10.1	8.9	8.1	11.7
Always	3.6	3.7	2.5	2.9	4.6
Seriously considered suicide					
Yes	16.6	17.4	11.4	11	21.8
No	80.7	80.9	86.1	86.4	74.2
Unidentified	2.7	1.7	2.6	2.6	4

Trends in Suicidal Ideation by Sex (2003-2019)

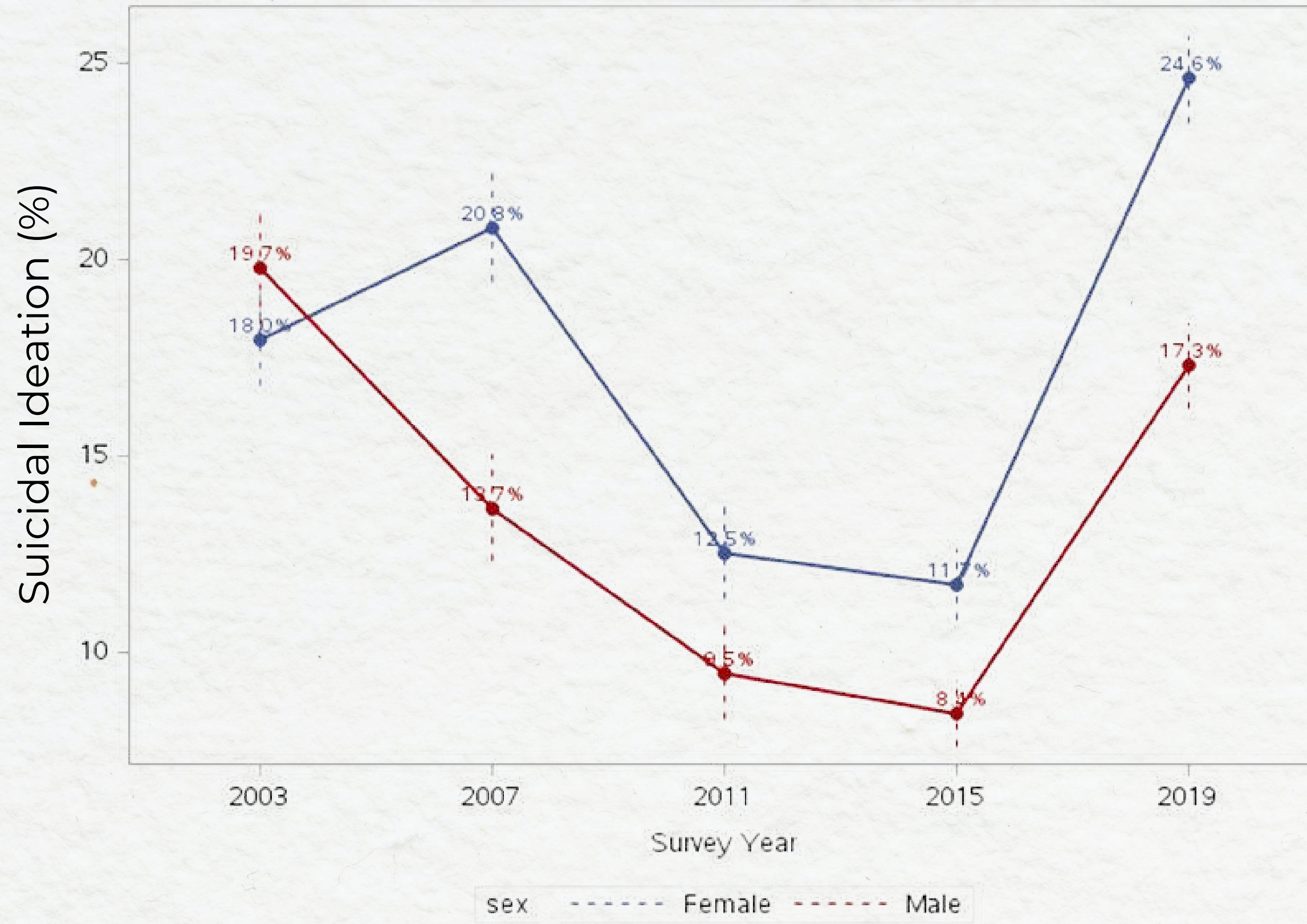


Figure 1. Prevalence of Suicidal Ideation by Sex per Year

Table 2. Percentage of adolescents who reported suicidal ideation by different psychosocial variables across survey years

Variable	2003	2007	2011	2015	2019	<i>p</i> -value
Sex						
Male	53.8	37.1	39.9	39.6	41	<0.001
Female	46	62.8	60	60.4	57.9	
Age Group						
≤ 14	39.7	28	42.6	46.1	64	<0.001
≥ 15	58	70.7	56.1	44.7	31.1	
Bullied in the past 30 days	39.1	49.8	52.9	62.4	53.7	<0.001
Almost always felt lonely for the past 30 days	14.9	36.4	24.6	35.3	8	<0.001
Having their parents understand their problems in the past 30 days	18.2	57	21.1	18	22.3	<0.001
Always went hungry in the past 30 days	11	9.7	8.8	8.3	15.9	<0.001
Drank at least once in the past 30 days	27.1	28.2	33.5	29.9	33.8	<0.001

p-value computed for the Cochran-Mantel-Haenszel test of conditional independence

Table 3. Factors associated with suicidal ideation among adolescents (2019 GSH Survey)

Predictor	Multiple Imputation		
	Estimate	SE	p-value
(Intercept)	-3.55	0.153	<0.001
Sex			
Male	-0.307	0.067	0.026
Female			
Bullied in the past 30 days			
Yes	0.582	0.053	0.004
No			
Felt lonely	0.297	0.035	0.008
Alcohol use	0.329	0.041	0.011
Parental understanding			
Yes	-0.456	0.053	0.004
No			
Could not sleep	0.289	0.029	0.003

Table 3. (Cont.d))

	Multiple Imputation
	p-value
Discrimination Performance	
% Concordant	71.4
% Discordant	27.9
Somer’s D	0.448
Gamma	0.448
Tau-a	0.224
c-statistic	0.724
Goodness of Fit Test	
Archer-Lemeshow	
	F = 0.973
	<i>p</i> = 0.468

Table 4. Adjusted odds ratios of factors associated with suicidal ideation among Filipino adolescents (2019 GSH Survey)

Predictor	Multiple Imputation	
	Odds Ratio	95% CI
Sex		
Male	0.74	(0.58, 0.93)
Female	1	
Bullied in the past 30 days		
Yes	1.79	(1.46, 2.18)
No	1	
Felt lonely	1.35	(1.18, 1.53)
Alcohol use	1.39	(1.18, 1.63)
Parental understanding		
Yes	0.63	(0.53, 0.76)
No	1	
Could not sleep	1.33	(1.21, 1.47)

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- Bullying remained widespread, with no clear improvement over time.
- Loneliness increased, showing deeper emotional distress among Filipino youth.
- Suicidal ideation rose, especially among female adolescents.
- Parental understanding improved slightly but declined again by 2019.
- Hunger and sleep problems became more common, reflecting worsening psychosocial and material stressors.

RECOMMENDATIONS

- Track individuals over time: Instead of just looking at different groups across years, future studies should follow the same adolescents over several years.
- Explore how factors connect: For instance, investigating how different risk factors influence each other.
- Use advanced data analysis: While current methods are good, using more complex statistical models can uncover deeper patterns.



THANK YOU!