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Suicidal Ideation and Suicidal Attempts among Adolescents in Low and Middle-Income Countries

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Abstract:- This study determined the similarities in countries in terms of suicidal ideation and suicidal attempts among female and male adolescents and determined the suicidal ideation and suicidal attempt index among adolescents in the four regions identified by World Health Organization as low and middle-income countries. An exploratory research employing the data mining technique, the Cluster and the Principle Component Analyses were used in the treatment of data obtained from the Global-School Based Health Survey on Suicidal Ideation and Suicidal Attempt among Adolescent ages 12-16 in 32 Low and Middle-Income Countries in 2003-2012. Findings revealed that female adolescents have higher suicide attempts and suicidal ideation than the male based on the clusters of regions on their similarities. Further, the African region had the highest suicidal attempts and ideation index among adolescents in the four regions among countries belonging to low and middle-income countries.

Keywords:- *Suicidal Ideation, Suicidal Attempts, Adolescents, Low and Middle Income Countries.*

I. INTRODUCTION

One of the modern major global health concern is suicide. It is one of the primary causes of death among adolescents worldwide. An estimated 6% of all the deaths among youths is attributed to suicide. Among males and females aged 10-24 years old, suicide constitutes a major public mental health problem; it is the second leading cause of death among females, and the third among males, respectively. By nature, young people are the more vulnerable demographic for problems which are mental and emotional in nature [1].

More than 90% of the world's children and youth live in Low- and Middle-income countries (LMCs). These countries account for over 75% of global suicide deaths. However, relatively little is identified about the epidemiology of adolescent suicide and suicidal behaviors in LMCs compared to high-income countries.

Suicidal behaviors include ideation, attempting suicide, planning suicide, and suicide itself. Suicidal ideation often begins in adolescence and is prevalent among this age group, particularly among females [2]. Youth suicide has recently gained massive public attention in the global health arena despite its potentially socially-charged repercussions. In addition to the loss of economic productivity for society and the loss of life, there is also that enduring psychological trauma on friends and relatives [3].

The significant risk factors for youth suicidal behaviors include being female, alcohol and drug use, exposure to bullying and violence, weak family and peer relationships, and mental disorders [4-6]. In preventing these deaths, identifying potentially modifiable risk factors is essential. Suicide prevention is the best option, given that most of the suicide cases do not get treatment, nor can they be treated.

With the considerable evidence derived from North America and Europe, recent research has expanded the knowledge of the determinants of youth suicidal behaviors in several LMCs. Many factors associated with youth suicidal behaviors in these countries overlap with established risk factors from high-income countries, which include bullying, disorders and depressive symptoms, physical, mental and sexual abuse, substance use and abuse, and weak family and social connections [7].

In over 80 countries worldwide, The Global School-Based Health Survey (GSHS) conducted surveys on the health of adolescents aged 13–17 years old to provide comparable data. The data have been used to show cross-national variations in the prevalence of adolescent suicide ideation, examine suicide ideation concerning psychosocial distress in seven African countries, and study adolescent suicidal behaviors in individual LMCs. The data further showed the drastic increase of cases in the past years worldwide. With the foregoing facts, urgent attention is required to address the alarming rise in both youth suicide cases and mental health issues.

Objectives of the Study

The study aimed to determine the similarities in countries in terms of suicidal ideation and suicide attempts among female and male adolescents, and to determine the suicidal ideation and suicidal attempt index among adolescents by regions.

Framework of the Study

The study is anchored on the Three-Step Theory [8], a theory rooted in the "Ideation to Action" Framework. First, the theory states that suicide ideation is the product resulting from the usual psychological pain combined with a sense of hopelessness. Second, among those experiencing both pain and hopelessness wherein ideation is escalating,

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connectedness is the key protective factor to combat it. And finally, the theory views the progression from ideation to attempts as facilitated by dispositional, acquired, and practical contributors to the capacity to attempt suicide.

In the study, the contributors are the factors in suicidal ideation and suicidal attempts among adolescents. These factors are physical attacks, bullying, food insecurity, lack of parental support, loneliness, few close friends, alcohol and drug use, and cigarette smoking [9]. Bullying is also listed as a risk factor for depression and thinking about suicide.

Bullying is also listed as a major risk factor for depression and thinking about suicide. Bullying can take many forms: it can be physical, verbal, or social and is usually repeated over a period of time. Hitting, beating up, kicking, spitting, pushing, property damage, and/or theft are common examples of physical bullying. Name-calling, teasing, insults, mocking, verbal humiliation/intimidation, defamation, threats, extortion, and/or homophobic, racist, sexist taunts constitute verbal or oral bullying.

Finally, rumor-spreading, gossip, embarrassment, ostracism, alienation, or exclusion from a group meant for all, and using the social or electronic media, internet, email, and text messaging to threaten, harass, and blackmail others are considered forms of social bullying [10]. The unprecedented rise of the internet age and social media has seen an alarming and almost epidemical rise of social bullying, especially among the vulnerable sectors and the youngsters--youngsters who are the most active users of the platform.

The unprecedented rise of the internet age and social media has seen an alarming and almost epidemical rise of social bullying, especially among the vulnerable sectors and the youngsters--youngsters who are the most active users of the platform. Moreover, a study has shown that students who perceived low levels of past parental support had a higher risk of suicide ideation. The past perceived parental support appeared to be a potent marker of suicide risks in young adults [11]. However, some studies show that adolescents exposed to major or minor life events related to suicidal ideation may have developed protective and adaptive factors or some form of psychological defense mechanisms [12], which mediate stresses and help prevent suicide attempts or ideation.

One known stress-buffering effect is heightened moral and social support from family relationships. Youngsters derive strength to live out their lives in the context of socially supportive relationships with parents firstly, other people in their families, then friends, teachers, and, schools, or communities, despite exposure to multiple stressors [13]. Moreover, adolescent substance use is found to aggravate suicidal behavior, and that the male showed more severe substance use behavior than the females.

II. METHODOLOGY

In this population-based study, the data was obtained from the Global School-based Student Health Survey (GSHS) of school children aged 12–16 years between 2003 and 2012, in 32 LMCs across four (4) WHO regions. The GSHS utilized the school-based, self-administered survey developed by the World Health Organization (WHO) and the United States Centers for Diseases Control and Prevention (USCDCP), in collaboration with the United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations International Children's Emergency Fund (UNICEF), and the Joint United Nations Programme on HIV/AIDS. The survey used school-based standard sampling, and modules with enclosed set of core questions. It addressed the leading causes of morbidity and mortality worldwide. This includes alcohol and drug use, violence and unintentional injury, mental health, and sexual behaviors. Table 1 shows the Global School-Based Health Survey Questions indicating the variables of the study.

Table 1. Global School-Based Health Survey Questions Used in the Analysis of Suicidal Ideation and Suicidal Attempts among Adolescents in Low and Middle-Income Countries

Variable	Question	Values
Physical Attack	How many times were you physically attacked during the past 12 months?	1 = 0 times 2 = 1 time 3 = 2 or more times
Bullying	On how many days were you bullied on during the past 30 days?	1 = 0 days 2 = 1 or 2 days 3 = 3 or more days
Food Insecurity/Going to Bed Hungry	How often did you go hungry because there was not enough food in your home during the past 30 days?	1 = never 2 = sometimes/rarely 3 = most of the time/ always
Loneliness	How often have you felt lonely during the past 12 months?	1 = never/rarely 2 = sometimes 3 = most of the time/ always
Lack of Parental Support	How often did your parents or guardians understand your problems and worries during the past 30 days?	1 = most of the time/ always 2 = sometimes 3 = never/rarely
Few Close Friends	How many close friends do you have?	1 = 3 or more 2 = 1 or 2 3 = none
Alcohol Use	On how many days did you have at least one drink containing alcohol during the past 30 days?	1 = 0 days 2 = 1–2 days 3 = 3 or more days
Cigarette Smoking	On how many days did you smoke cigarettes during the past 30 days?	1 = 0 days 2 = 1–5 days 3 = 6 or more days

The 32 identified LMCs by the WHO by region were African region with countries namely: Benin, Botswana, Kenya, Malawi, Mauritania, Uganda, United Republic of Tanzania, Zambia, and Zimbabwe; the Americas region with countries: Argentina, Chile, Costa Rica, Ecuador, Guatemala, Guyana, Peru, Trinidad, and Tobago, and Venezuela; Eastern Mediterranean region with Jordan, Kuwait, Lebanon, Morocco, Pakistan, Tunisia, and United Arab Emirates; and the South-East Asia and Western Pacific with the countries: China, Indonesia, Malaysia, Maldives, Philippines, Sri Lanka, and Thailand.

Among the countries, seven belong to the lower-income, eight belong to middle income, 14 from upper middle income, and three from higher-income countries. The three higher-income countries were included in the survey since very little is known on the suicidal ideation among the youth in these countries. Table 2 shows the 4 WHO regions in the survey.

Table 2. Survey year(s) and Sample Size for Countries that Participated in the Global School-Based Health Survey 2003–2012

Country by WHO region	Income Classification	Year of survey(s)	Sample size
African			
Benin	LIC	2009	2 659
Botswana	UMC	2005	2 114
Kenya	LIC	2003	3 317
Malawi	LIC	2009	2 213
Mauritania	LMC	2010	1 956
Uganda	LIC	2003	2 985
Tanzania	LIC	2003	2 103
Zambia	LMC	2003	1 960
Zimbabwe	LIC	2003	5 482
Americas			
Argentina	UMC	2007	1 911
Chile	UMC	2004	8 028
Costa Rica	UMC	2009	2 626
Ecuador	UMC	2007	5 232
Guatemala	LMC	2009	5 370
Guyana	LMC	2004, 2010	3 471
Peru	UMC	2010	2 832
Trinidad and Tobago	HIC	2007, 2011	5 482
Venezuela	UMC	2003	4 252
Eastern Mediterranean			
Jordan	UMC	2004, 2007	4 359
Kuwait	HIC	2011	2 629
Lebanon	UMC	2007, 2011	7 245
Morocco	LMC	2006, 2010	5 275
Pakistan	LMC	2009	5 085
Tunisia	UMC	2008	2 759
United Arab Emirates	HIC	2005	15 077
South-East Asia and Western Pacific			
China	UMC	2004	8 753
Indonesia	LMC	2007	3 088
Malaysia	UMC	2012	20 849
Maldives	UMC	2009	2 919
Philippines	LMC	2007, 2011	17 497
Sri Lanka	LMC	2008	2 524
Thailand	UMC	2008	2 718

HIC: high-income countries; LIC: low-income; LMC: lower-middle-income; UMC: Upper-middle income; WHO: World Health Organization. Classification according to The World Bank.

Figure 1. The regions identified by WHO in the survey

The current study employed the exploratory statistical analysis, using the Cluster Analysis (CA) and Principal Components Analysis (PCA) in the statistical treatment of the data from the GSHS survey. The CA was used to determine the similarities in countries in terms of suicidal ideation among female and male adolescents. The PCA was utilized to determine the Suicidal Ideation and Suicidal Attempt Index among adolescents by regions. Since the data was publicly available on the GSHS website, no ethical considerations were observed.

III. RESULTS AND DISCUSSIONS

A. Clusters of Countries in Terms of the Suicidal Ideation and Suicidal Attempt among Female and Male Adolescents

The clusters of countries determine the suicidal ideations and suicidal attempts among female and male adolescents. Figure 2 is the dendrogram showing the clusters of countries.

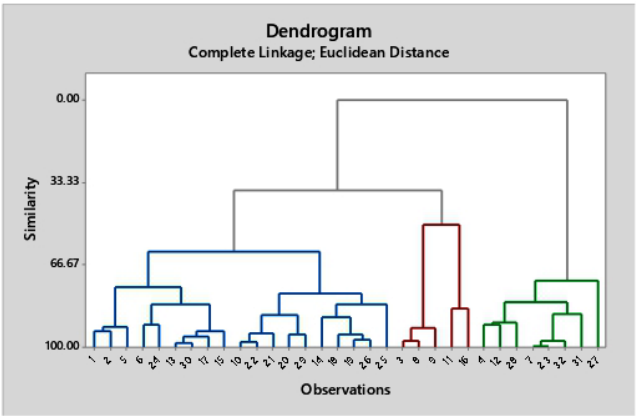

Figure 2. Dendrogram showing the Clusters of Countries.

Figure 2 reveals that there are 19 countries in Cluster 1. The countries include Benin, Botswana, Mauritania, Uganda, Argentina, Ecuador, Guatemala, Guyana, Trinidad and Tobago, Venezuela, Jordan, Kuwait, Lebanon, Morocco, Tunisia, United Arab Emirates, China, Maldives, and the Philippines. It is observed that the countries in Cluster 1 are scattered in the four regions, 40% coming from the African regions, 56% Americas, Eastern Mediterranean 86%, and South-East Asia and Western Pacific 43%. These countries are of varied income classification.

Cluster 2 has five countries: Kenya, Zambia, Zimbabwe, Chile, and Peru. These countries are from the two regions, the African and the Americas. The countries comprising Cluster 3 are Malawi, the United Republic of Tanzania, Costa Rica, Pakistan, Indonesia, Malaysia, Sri Lanka, and Thailand.

Table 3 reveals the cluster centroids of suicidal ideation and suicidal attempts among female and male adolescents. As shown in the figure, the suicidal ideation in these countries is higher in females, second in rank among the clusters, and the gender difference in Cluster 1 is higher among the Clusters. The variation in the 3 clusters may, in part, reflect differences in the meaning of suicidal thoughts and normative attitudes towards suicide across economic settings, religious beliefs, and diverse cultural backgrounds [14].

Table 3. The Cluster Centroids of Suicidal Ideation and Suicidal Attempts Among Female and Male Adolescents

Variable	Cluster 1	Cluster 2	Cluster3	Grand Centroid
Females	20.3053	28.66	8.9750	18.7781
Males	15.6684	21.26	8.0625	14.6406

Further, Cluster 2 has the highest suicidal ideation in females and the highest among the clusters. The higher prevalence of suicidal behaviors among adolescents in African countries may be partly explained by the high human immunodeficiency virus (HIV). Moreover, aside from the high acquired immunodeficiency syndrome (AIDS) incidence, political instability and the food insecurity in the area contributed to its alarming prevalence [9]. Cluster 3 indicated that gender differences were similar in magnitude, showing less gender disparity.

B. Suicidal Ideation and Suicidal Attempt Index among Adolescents by Region

Using the Principal Component Analysis (PCA), the suicidal ideation and suicidal attempt index by region as identified. Table 4 presents the Eigen Analysis of the Covariance Matrix of 8 factors of suicidal ideation and suicidal attempt. The Eigen values are weights of principal components obtained. Results show that the first eigenvector or principal component represents 98.5% of the total variance. It is sufficient to represent all eight factors.

Principal Component Analysis: Physical Att; Bullying; Going to bed; Few Friends; Loneliness;								
Eigenanalysis of the Covariance Matrix								
Eigenvalue	156.66	1.57	0.90	0.00	0.00	-0.00	-0.00	-0.00
Proportion	0.985	0.010	0.006	0.000	0.000	-0.000	-0.000	-0.000
Cumulative	0.985	0.994	1.000	1.000	1.000	1.000	1.000	1.000

As shown in Table 5, the PCA result yielded 3 PCAs. PCA 1 was considered for its relevance in the computation of the suicidal ideation and suicidal attempt index by region.

Table 5. On the Principal Component Analysis of the Factors

Principal Component Analysis: Physical Att; Bullying; Going to bed; Few Friends; Loneliness;			
Variable	0.359	-0.006	0.301
Physical Attack	0.333	-0.023	-0.216
Going to bed Hungry	0.353	0.160	-0.000
Few Friends	0.360	-0.167	-0.250
Loneliness	0.353	-0.100	0.801
Lack of Parental Support	0.389	0.210	-0.120
Alcohol Use	0.296	-0.783	-0.262
Cigarette Smoking	0.378	0.529	-0.275

Based on PC1 in Table 5, the suicidal ideation and suicidal attempt among adolescent index by region were determined as indicated in Table 6. It reveals that the region with the highest suicidal ideation and suicidal attempt index among adolescents is the African Region.

Table 6. Suicidal Ideation and Suicidal Attempt Index among Adolescents

Region	Countries	Suicidal Ideation and Suicidal Attempt Index
African	Benin, Botswana, Keny, Malawi, Mauritania, Uganda, United Republic of Tanzania, Zambia, Zimbabwe	67.64054
Americas	Argentina, Chile, Costa Rica, Ecuador, Guatemala, Guyana, Peru, Trinidad and Tobago, Venezuela	52.75968
East Mediterranean	Jordan, Kuwait, Lebanon, Morocco, Pakistan, Tunisia, United Arab Emirates	46.09344
South-East Asia and Western Pacific	China, Indonesia, Malaysia, Maldives, Philippines, Sri Lanka, Thailand	38.45979

The main or primary reason identified in 87% of suicide victims in this region was financial hardship. In a study conducted in India for example, it was firmly highlighted that there was a significant contextual influence of the high concentration of family poverty on adolescent suicide ideation and attempts [15].

The massive unemployment rate of 64%, along with family disintegration, sickness, and excessive consumption of alcohol/drugs, are the major underlying causes of suicides among young adults [16].

It can also be gleaned from the preceding table that the region with the lowest index is South-East Asia and the Western Pacific. The data shows the latest trends in countries for the period 1995–2009, indicating that China and Sri Lanka showed a stable decline [9]. The extent of the rate of suicide decline in Sri Lanka for the said period was nothing short of astounding. Recently however, both government and non-government organizations have been doing extensive, serious, and varied types of suicide prevention intervention programs and measures in most Asian countries. Even though many of these programs may not have adequate evidence as to their efficacy, they reflect culturally-specific nuances and locally-relevant experiences.

IV. CONCLUSION

In conclusion, female adolescents have higher suicidal ideation and suicide attempts than the male based on the clusters of regions on their similarities. Further, the African region has had the highest suicidal ideation and suicidal attempt index among adolescents. This provides crucial information that justifies expanded efforts to initiate and develop a comprehensive program for the screening of suicidal behavior in this region, and hopefully arresting the alarming rise of suicidal ideation and attempts in the area--if not altogether ending it. Especially for female adolescents, the provision of urgent intervention and mental health services may be necessary.

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