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Adolescent Mental Health in Europe: Correlations between Self-Reported Emotional Well-being and Suicide Mortality Among Adolescents

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ABSTRACT

Objective: Adolescent mental health is a critical public health issue. In Europe, suicide is one of the leading causes of death among young people, with a rising trend observed in recent years. *Methodology:* This study analyses the relationship between self-reported mental health indicators and suicide mortality rates among adolescents aged 15–19 across 30 European countries, with a particular focus on Poland. We sourced the data from the 2022 Health Behaviour in School-aged Children (HBSC) and Eurostat (ESTAT). We examined variables such as bullying, family support, body image and substance use for their potential correlations with suicide rates. *Results:* The only variable that has a statistically significant correlation with higher suicide mortality is “negative body image” ($\rho = -0.435$, $p = 0.018$). Polish adolescents reported the worst body image among all 30 European countries included in the study, consistently across the 11-, 13- and 15-year-old age groups. Other variables did not demonstrate a significant correlation with suicide mortality. *Conclusion:* To prevent further escalation of adolescent suicide in Europe, it is essential to understand the multilayered risk factors involved. In particular, future research should prioritise the determinants of negative body image in youth, as it has been shown to be a statistically significant risk factor associated with increased suicide mortality rates. Gender-specific research is also necessary as the risk factors may vary depending on gender.

Keywords: suicide mortality, body image, public health, Adolescent mental health.

1. INTRODUCTION

Mental health is a fundamental determinant of life satisfaction and overall well-being. Each individual has a different vulnerability to psychological distress and processes adverse situations in their own way. Adolescents, being in a critical developmental stage in their lives, are particularly susceptible to difficulties in coping, as they are still in the process of acquiring the skills necessary for effective

emotional regulation. They also often lack support and guidance in this area, which should be provided by parents or guardians, schools and other educational institutions- though this is rarely the case. Nevertheless, there are countries where supporting emotional growth in youth seems to be given greater attention. Whether intentional or not, the most crucial aspect is the outcome it produces in children.

Mental and emotional development is highly individual for each young person. However, certain patterns can be observed across specific countries, which we aim to present here.

In this paper we would like to take into consideration different emotional states and how they may contribute to adolescents' overall mental well-being. We focus on exploring possible correlations between emotional states and suicide mortality rates among adolescents across European countries.

The data discussed in this paper come from international studies and surveys examining the health, symptoms and behaviours of young people. HBSC (Health Behaviour in School-aged Children) is a unique cross-national research study into the well-being of adolescents across Europe and North America, in collaboration with the World Health Organization (WHO). HBSC's data are collected in all participating countries through school-based surveys using a standard methodology to ensure representativeness across age groups (HBSC, 2025).

From HBSC, we selected the following indicators from 2022 for the age group 15 years old:

- (a) frequent feelings of low mood,
- (b) frequent feelings of nervousness,
- (c) frequent feelings of loneliness,
- (d) bullied at school,
- (e) bullied online,
- (f) mean mental well-being score (WHO-5), (Topp et al., 2015)
- (g) feeling family support,
- (h) overall health,
- (i) life satisfaction,
- (j) body image,
- (k) drunkenness,
- (l) cannabis use.

These indicators, while subjective, are important risk factors and can serve as early markers of vulnerability to more severe mental health problems. Particular attention was given to Poland which reports both one of the highest suicide mortality rates and some of the poorest mental health outcomes among young people in Europe. We also compared Poland with countries at both extremes of the distributions to provide illustrative contrasts.

The objective of this study was to evaluate the correlation between HBSC variables (a- j) and crude suicide mortality rates among adolescents in both males and females aged 15 years and above. Understanding these associations at a cross-national level could provide insight into whether adolescents' self-reported emotional difficulties correspond with objective health outcomes.

2. REVIEW METHODS

We conducted an ecological cross-sectional study using publicly available, country-level data. We used two primary sources:

2.1. HBSC surveys

We extracted data from the 2022 Health Behaviour in School-aged Children study, a WHO-collaborating project that collects nationally representative data on health behaviours and subjective health indicators among 11-, 13- and 15-year-olds in 43 countries. We focused on the 15-year-old cohort, as it aligns most closely with the 15–19 age group provided by Eurostat.

We ranked the countries according to the prevalence of adolescents reporting the symptom. We recorded Poland's position within the distribution to better present the issue. Out of the 43 countries participating in the HBSC study, we excluded non-European countries. We removed Canada, Greenland, Israel, Kazakhstan, Armenia, Kyrgyzstan and Tajikistan from the dataset and subsequent statistical analyses. This exclusion was undertaken to ensure that the presented trends and statistical estimates more accurately reflect the European context and to enable a more direct comparison with European data derived from the Eurostat Mortality Database.

We also had to exclude several European countries from our analysis because corresponding data on suicide mortality rates were not available in Eurostat. Ultimately, our analysis included 30 European countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland. HBSC provides separate prevalence estimates for boys and girls for each indicator. To derive an overall national value, we calculated the arithmetic mean of the male and female percentages. This overall prevalence was used for cross-national comparisons.

2.2. Eurostat mortality database

We obtained crude suicide mortality rates (ICD-10 codes X60–X84: intentional self-harm) per 100,000 population for the age group 15–19 years in 2022 (Eurostat, 2022a).

2.3. Variables

HBSC indicators

We included the following indicators reflecting internalising symptoms:

a) Frequent feelings of low mood

Adolescents were asked how often they had felt low during the past six months. Response options ranged from “nearly every day” to “rarely or never”. Frequent low mood was defined as feeling low more than once a week (HBSC, 2022a).

b) Frequent feelings of nervousness

Assessed using the same frequency scale as for low mood. Frequent nervousness was classified using the exact threshold — reporting feelings of nervousness more than once a week (HBSC, 2022b)

c) Frequent feelings of loneliness

Adolescents were asked how often they had felt lonely during the past year, with response options: “never”, “rarely”, “sometimes”, “most of the time” and “always”. The findings presented the proportion of respondents who reported feeling lonely most of the time or always (HBSC, 2022c).

d) Bullied at school

Participants were asked how often they had been bullied by other students at school during the past couple of months. Response options ranged from “I have not been bullied at school at given time” to “I have been bullied several times a week”. Results demonstrate the percentage who reported being bullied at least two or three times a month in the past couple of months (HBSC, 2022d).

e) Bullied online (cyberbullying)

Young people were asked how often they had experienced cyberbullying (for example, receiving mean messages, having photos or videos of them shared online without their consent). The same scale as for d) was used and frequent cyberbullying was defined as experiencing those situations at least once or twice a month in the past few months (HBSC, 2022e).

f) Mean mental well-being score (WHO-5)

Respondents were asked how often during the previous two weeks they had: felt cheerful and in good spirits, calm and relaxed, active and vigorous, woken up feeling fresh and rested and felt that their daily life was filled with interesting things. Answers ranged from “all the time” to “at no time” and were summed to create a score between 0 and 100. Higher scores indicate better mental well-being (HBSC, 2022f).

g) Feeling family support

Participating children were asked to what extent they agreed with various statements such as: “My family tries to help me”, “I get emotional support from my family when I need it”, “I can talk to my family about problems” and “My family members are willing to help me make decisions”. Responses ranged from “very strongly disagree” to “very strongly agree”. Scores were averaged (1–7 scale)

and children scoring equal and above 5.5 in the family section of the Multidimensional Scale of Perceived Social Support were classified as having high perceived family support (HBSC, 2022g).

h) Rating health as excellent

Participants were asked: „Would you say your health is...?” with the options „excellent”, „good”, „fair” and „poor”. The findings report the percentage who rated their health as excellent (HBSC, 2022h).

i) Life satisfaction

Life satisfaction was measured using the Cantril Ladder, an 11-step visual analogue scale where 0 represents “the worst life imaginable” and 10 „the best life”. It demonstrates the mean life satisfaction score (HBSC, 2022i).

j) Body image

Adolescents were asked how they perceived their body size. Responses ranged from “much too skinny” to “much too fat”. The findings show the percentage of respondents who perceived themselves as too fat („a bit too fat” or „much too fat”) (HBSC, 2022j).

k) Drunkenness

Participants were asked on how many occasions during the past 30 days they had drunk enough alcohol to feel really drunk. Response options included: “none”, “once”, “2–3 times”, “4–10 times” and “more than 10 times”. The findings show the proportion who reported being drunk on one or more occasions in the past 30 days (HBSC, 2022k).

l) Cannabis use

Fifteen-year-olds were asked how often they had used cannabis in the past 30 days. Response options were: “never”, “1 to 2 days”, “3 to 5 days”, “6 to 9 days”, “10 to 19 days”, “20 to 29 days” and “30 days (or more)”. The findings show the proportion who had used cannabis on at least one day in the past 30 days (current use) (HBSC, 2022l).

Suicide mortality

The primary outcomes were crude suicide mortality rates (per 100,000) among adolescents aged 15–19 years in 2022 as reported by Eurostat. Data were analysed using Excel. We calculated spearman correlation coefficients. A p-value of <0.05 was considered statistically significant.

3. RESULTS & DISCUSSION

(a) frequent feelings of low mood

In 2022 43% of Polish 15-year-olds reported feeling low more than once a week, ranking Poland 2nd highest. The prevalence of low mood ranged from 17% in Serbia to 56% in Italy. Hungary was 2nd with 44%. Poland ranked above the European mean for the proportion of adolescents reporting feeling low (32.5%).

(b) frequent feelings of nervousness

53.5% of Polish 15-year-olds reported feeling nervous more than once a week, ranking Poland 3rd highest. The two countries above are Italy (60.5%) and Greece (59.5%). Hungary was on the 4th place with 51.5%. The lowest prevalence was in Denmark (9.5%) and Albania (13.5%). Poland ranked above the European mean for the proportion of adolescents reporting feeling nervous (40.7%).

(c) frequent feelings of loneliness

29% of Polish 15-year-olds reported feeling lonely most of the time or always, ranking Poland 1st highest together with England (29%). Latvia (28%) is the 2nd highest. Countries with the smallest percentage are Denmark (9,5%) and the Netherlands (14,5%). Poland ranked above the European mean for the proportion of adolescents reporting feeling lonely (20.9%). In addition Poland was also on the 1st place in the age group 13-year-olds with 27%.

(d) bullied at school

9.5% of Polish 15-year-olds reported being bullied at least two or three times a month in the past couple of months, ranking Poland 7th highest among participating countries. Top three countries were Lithuania (18.5%), Latvia (16.5%) and Bulgaria (16%). With the lowest percentage: France (3%), Spain (3%) and Italy (3.5%). Poland ranked above the European mean for the proportion of adolescents reporting being bullied (8.5%).

(e) bullied online

21.5% of Polish 15-year-olds reported being bullied online at least once a month in the past couple of months, ranking Poland 3rd together with Latvia. Top two countries are Lithuania (23%) and Bulgaria (22%). Countries with the smallest percentage are Spain (5%), Portugal (7%) and Italy (8%). Poland ranked above the European mean for the proportion of adolescents reporting being cyberbullied (14%).

(f) mean mental well-being score (WHO-5)

Poland has the lowest mean mental well-being score from all participating countries (46,65 %). Two other countries with the smallest percentages are Slovenia (47.05 %) and Italy (47.95%). Countries with the highest scores are Denmark (61.7%) and Croatia (60,2%). The European mean was 54.3%. Poland also ranks last in the 13-year-old age group (50.3%).

(g) feeling family support

Poland ranks last among the surveyed countries in terms of children's perceived family support. Only 44% of Polish children reported high levels of family support, indicating a relatively low proportion compared to other nations. In contrast, the highest levels were observed in Denmark (77%) and Switzerland (74.5%). Poland scored below the European mean (61,5).

(h) rate health as excellent

Only 14% of Polish 15-year-olds rate their health as „excellent” which ranks Poland last among the surveyed countries. Other two countries with the lowest scores are Latvia (15,5%), Hungary (19,5%) and Wales (19.5%). Countries with the highest percentages are Serbia (60,5%), Cyprus (44%) and Bulgaria (44%). The European mean is 31,4%.

(i) life satisfaction

With a mean score of 6.3 (on a scale of 0 to 10), Polish 15-year-olds ranked second to last in life satisfaction. Lower life satisfaction was recorded only in Slovakia (6). Ireland's average was the same as in Poland (6,3). Countries with the highest life satisfaction are Serbia (8) and Romania (7.8). The European mean score is 7. We think it's also worth noting that Polish 13-year-olds reported the lowest life satisfaction among all participating countries (6,3%).

(j) body image

Children in Poland reported the lowest body image scores among all participating nations. 44% of Polish 15-year-olds perceives their body as too fat which ranks Poland on the 1st place. On the 2nd place there is Ireland and Germany both with the outcome 39,5%. The countries with the smallest percentages and therefore with the most positive body image are Serbia (16,5%), Cyprus (23,5%) and Bulgaria (23,5%). The European mean is 31,9%. Poland also ranks first in both the 13-year-old (47.5%) and 11-year-old (42%) categories. Consequently, Polish children across all age groups have the poorest body image of all European children surveyed.

Although Polish adolescents report the most negative body image among all European countries participating in the HBSC study, this perception is not reflected in objective measures of body weight. According to Eurostat data, Poland ranks 19th out of 39 European countries in terms of the prevalence of overweight among young people aged 16–24 years, with a rate of 22.4%. This position places Polish youth in the middle of the European distribution rather than among the heaviest groups. This highlights an important mismatch between actual body mass and body image perception, suggesting that psychological and sociocultural factors play a crucial role in creating body dissatisfaction among Polish youth. (Eurostat, 2022b).

(k) Drunkenness

In Poland 18.5% of children reported having been drunk at least once during the past 30 days, placing the country 9th highest among the surveyed nations. This percentage is above the European average of 16.7%, indicating a relatively high prevalence of recent alcohol intoxication among Polish youth. The highest proportions were observed in Denmark (34.5%), Bulgaria (29%) and Hungary (27%), whereas the lowest rates were found in Iceland (6%), Portugal (8.5%) and Luxembourg (9.5%).

(l) cannabis use

Poland is second among the surveyed countries in terms of the proportion of 15-year-olds who reported cannabis use within the past 30 days, with a rate as high as 12.5%. Only Bulgaria reported a higher prevalence (13.5%), while Italy ranked third (12%). The European average was 6.8%, indicating that cannabis use among Polish adolescents substantially exceeds the continental mean. The lowest rates were observed in Romania (3%), Portugal (3.5%) and Iceland (3.5%). Comparison of the HBSC variables is presented in Table 1.

Table 1. Comparison of HBSC variables in 2022, with attention on Poland

Variable	Poland's Rank & %	European Mean	Highest Country (%/score)	Lowest Country (%/score)
(a) Frequent feelings of low mood	3/30 (43%)	32.5%	Italy (56%)	Serbia (17%)
(b) Frequent feelings of nervousness	3/30 (53.5%)	40.7%	Italy (60.5%)	Denmark (9.5%)
(c) Frequent feelings of loneliness	1/30 (29%)	20.9%	Poland & England (29%)	Denmark (9.5%)
(d) Being bullied at school	7/29 (9.5%)	8.5%	Lithuania (18.5%)	France (3%)
(e) Being bullied online (cyberbullying)	3/30 (21.5%)	14%	Lithuania (23%)	Spain (5%)
(f) Mean mental well-being (WHO-5)	28/28 (46.65%)	54.3%	Denmark (61.7%)	Poland (46.65%)
(g) Feeling family support	30/30 (44%)	61.5%	Denmark (77%)	Poland (44%)
(h) Rate health as excellent	30/30 (14%)	31.4%	Serbia (60.5%)	Poland (14%)
(i) Overall life satisfaction (0–10 scale)	29/30 (6.3)	7.0	Serbia (8.0)	Slovakia (6.0)
(j) Negative body image ("too fat")	1/29 (44%)	31.9%	Poland (44%)	Serbia (16.5%)
(k) Drunkenness (past 30 days)	9/29 (18.5%)	16.7%	Denmark (34.5%)	Iceland (6%)
(l) Cannabis use (past 30 days)	2/29 (12.5%)	6.8%	Bulgaria (13.5%)	Romania (3%)

ESTAT

To compare European countries based on deaths by suicide among adolescents, we accessed the Eurostat database and selected data concerning European countries only. The dataset presents the crude death rate by NUTS 2 region of residence (the mortality rate measured as the total number of deaths per 100,000 inhabitants within these basic regional divisions).

In Poland the crude mortality rate for the 15–19-year-old age group (both sexes) decreased from 2013 (9.08) to 2018 (5.03) but then increased again from 2019 (6.06) to 2022 (8.32). In 2022 Poland ranked 29th out of 30 countries, with only Iceland showing a higher crude mortality rate (8.57).

The situation was different in earlier years due to a significant decrease in mortality rates in many European countries after 2021. In 2021, Poland (7.95) ranked 25th, while the following countries had higher mortality rates: Lithuania (8.57), Iceland (8.86), Finland (9.32), Norway (11.02), Estonia (12.22) and Slovenia (13.72). All these countries, except Iceland, recorded a substantial decline in suicide rates afterward. Spearman’s ρ was calculated using data from fewer than 30 countries in instances of missing data. The sample size was $n=29$ for “bullying at school” (excluding Switzerland), “body image” (excluding Norway), “alcohol consumption” (excluding Serbia) and “cannabis use” (excluding Norway). For “well-being” the calculation included 28 countries (with Bulgaria and Serbia omitted).

Spearman correlation results and interpretation:

Body image demonstrates a moderate to strong negative correlation ($\rho = -0.435$) that is statistically significant ($p = 0.018$). The data indicates that a 'too fat' body perception among 15-year-olds is significantly associated with higher suicide mortality rates within that age group (Table 2). The association between negative body image and suicide mortality rate is presented on the scatter graph (Figure 1).

Table 2. Comparison of ρ Spearman correlation and p- values for a- l HBSC variables

Zmienna	ρ (Spearman)	n	p-value	Interpretacja
a) feeling low	-0,053	30	0,769	No correlation
b) feeling nervous	-0,305	30	0,107	No correlation
c) feeling lonely	-0,005	30	0,979	No correlation
d) bullied at school	-0,160	29	0,407	No correlation
e) cyberbullied	-0,160	30	0,398	No correlation
f) Who- 5 well-being	-0,028	28	0,888	No correlation
g) family_support	-0,016	30	0,933	No correlation
h) mean mental well-being	-0,140	30	0,461	No correlation
i) life satisfaction	-0,084	30	0,659	No correlation
j) body image	-0,435	29	0,018	Statistically significant correlation
k) alcohol	-0,020	29	0,918	No correlation
l) cannabis use	-0,268	29	0,160	No correlation

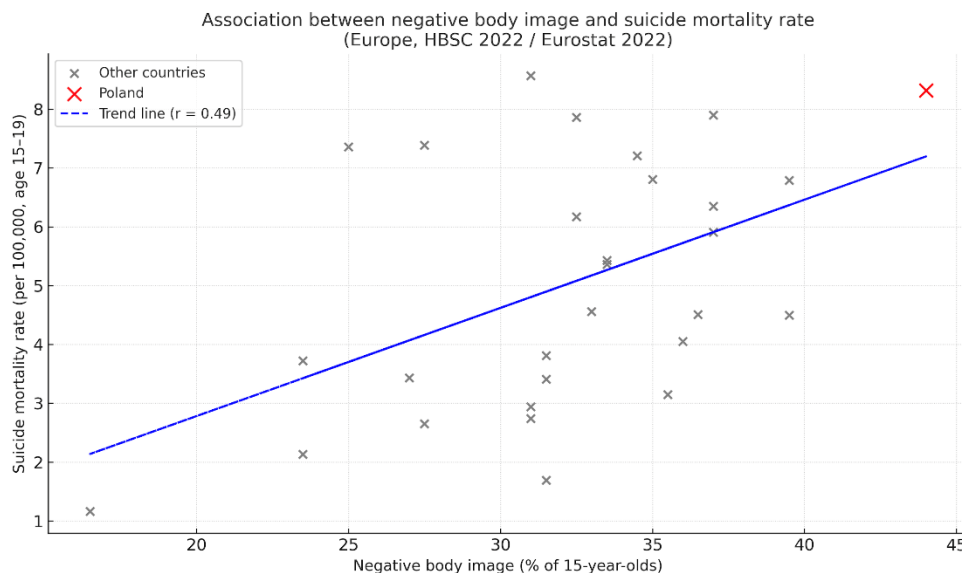


Figure 1 scatter graph

Other variables show no significant correlation to suicide mortality rate, as their p-values are greater than 0.05. Feeling nervous ($p=0,107$) and cannabis use ($p=0,160$) show no statistically significant correlation, but they are the two variables closest to reaching significance; therefore, in our opinion, these variables also need further investigation.

4. CONCLUSION

While many European countries have shown a positive trend in reducing adolescent suicide mortality, in Poland the problem has continued to worsen over time. We conclude that negative body image is a statistically proven, critical psychological marker for suicide risk among adolescents. Therefore, further research is necessary to understand the underlying factors contributing to the severity of body dissatisfaction observed among adolescents. All variables also should be investigated for both sexes separately- there could be a significant correlation with suicide mortality rate for only one sex.

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Informed consent

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on reasonable request to the corresponding author.

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