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Research paper

Global time trends of perceived loneliness among adolescents from 28 countries in Africa, Asia, and the Americas

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ABSTRACT

Background: Perceived loneliness in adolescence is associated with a plethora of adverse outcomes. However, data on its temporal trends are scarce. Therefore, we aimed to examine the temporal trend of perceived loneliness among school-going adolescents aged 12–15 years from 28 countries in Africa, Asia, and the Americas, where temporal trends of loneliness are largely unknown.

Methods: Cross-sectional data from the Global School-based Student Health Survey 2003–2017 were analyzed. Perceived loneliness referred to feeling lonely most of the time or always in the past 12 months. Crude linear trends of perceived loneliness by country were assessed by linear regression models.

Results: Data on 180,087 adolescents aged 12–15 years were analyzed [Mean (SD) age 13.7 (1.0) years; 51.4 % females]. The overall prevalence of perceived loneliness was 10.7 %. Among the 28 countries included in the study, significant increasing and decreasing trends were observed in six counties each, with stable trends found in 16 countries. The most drastic increase and decrease were observed in Egypt between 2006 (7.9 %) and 2011 (14.3 %), and in Samoa between 2011 (23.3 %) and 2017 (8.0 %), respectively. Stable trends with high prevalence across time were also common.

Conclusion: Our data suggest that perceived loneliness among adolescents is a global phenomenon, which has seen little improvement if any in recent years. It would be prudent to implement nationwide policies to combat loneliness globally.

1. Introduction

Perceived loneliness is a distressing feeling that accompanies the perception that one's social needs are not being met in regards to the quantity or especially the quality of one's social relationships (Ernst and Cacioppo, 1999). Loneliness is synonymous with perceived, but not objective social isolation. People can live rather solitary lives but not feel lonely, and conversely, those with a rich social life can still feel lonely

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(Hawkley and Cacioppo, 2010). Perceived loneliness is a highly prevalent condition. For instance, in a recent systematic review and meta-analyses on the prevalence of perceived loneliness in 113 countries, it was concluded that perceived loneliness at a problematic level is a common experience worldwide across all age groups including adolescents. The pooled prevalence of perceived loneliness for adolescents ranged from 9.2 % (95%CI = 6.8 %–12.4 %) in South-East Asia to 14.4 % (12.2 % to 17.1 %) in the Eastern Mediterranean region (Surkalim et al., 2022). A high worldwide prevalence of perceived loneliness is of significant concern as it has been associated with a plethora of detrimental health outcomes. For example, perceived loneliness is associated with a higher risk for suicide attempts, depressive symptoms (Solmi et al., 2020;), cardiovascular diseases, metabolic syndrome, functional disability, dementia, and premature mortality (Hawkley, 2022; Hawkley and Capitanio, 2015). In adolescents, perceived loneliness is also associated with multiple health risk behaviors, including illicit drug use, alcohol consumption, and risky sexual behaviors (Stickley et al., 2014).

While literature does exist on the global prevalence of perceived loneliness, data on its temporal trends are scarce, especially among adolescents (Surkalim et al., 2022). Understanding temporal trends is important as this information is crucial for the establishment of policies that aim to reduce perceived loneliness. To date, most studies on perceived loneliness trends among adolescents have been conducted in single high-income Western countries. For example, one study found that the prevalence of perceived loneliness increased from 4.4 % in 1991 to 7.2 % in 2014 among adolescents in Denmark (Madsen et al., 2019). Furthermore, one study from the USA found a decline in perceived loneliness over time in high schools students (1991–2012) (Clark et al., 2015). To the best of the author's knowledge, there is one study on this topic that has included multiple countries. This study included 1,049,784 adolescents aged 15 to 17 years across 37 countries (mainly high-income Western countries) and found that school loneliness (i.e., feelings of loneliness in the school environment; also known as school belonging or school connectedness in its inverse) increased between 2012 and 2018 in 36 countries. Furthermore, nearly twice as many adolescents in 2018 (vs. 2012) had elevated levels of school loneliness (Twenge et al., 2021). However, the focus of this study was only on school loneliness, and thus, temporal trends in general perceived loneliness per se (including both in and out of school) at a global level are largely unknown. It is plausible to assume that feelings of loneliness may be more likely out of school time when adolescents may be spending time inside and alone.

Given the scarcity of studies on trends of adolescent perceived loneliness, especially on a global scale including a large number of low- and middle-income countries (LMICs), the aim of the present study was to examine the temporal trend of perceived loneliness in a sample of 180,087 school-going adolescents aged 12–15 years from 28 countries in Africa, Asia, and the Americas (predominantly LMICs) for which temporal trends of general perceived loneliness are unknown.

2. Methods

2.1. The survey

We analyzed publically available data from the Global School-based Student Health Survey (GSHS). Details on this survey are provided at https://www.who.int/teams/noncommunicable-diseases/surveillance/data and http://www.cdc.gov/gshs. In brief, this survey was developed by the WHO in conjunction with the US Centers for Disease Control and Prevention (CDC) and other UN allies. The main aim of this survey was to identify risk factors of major non-communicable diseases. A standardized two-stage probability sampling design was employed for the selection process within each country. Schools were selected with probability proportional to size sampling in the first stage. The second stage consisted of the random selection of classrooms which included students aged 13–15 years within each selected school. All students in the selected classrooms were eligible to participate in the survey regardless of age. Thus, the sample did not only consist of those aged 13–15 years. Data collection was conducted during one regular class period. The questionnaire was translated into the local language in each country and consisted of multiple-choice response options. Students recorded their responses on computer scannable sheets. All GSHS surveys were approved, in each country, by both a national government administration (most often the Ministry of Health or Education) and an institutional review board or ethics committee. Student privacy was protected through anonymous and voluntary participation, and informed consent was obtained as appropriate from the students, parents and/or school officials. Data were weighted for non-response and probability selection.

From all publically available data, we selected all nationally representative datasets that included the variables used in our analysis, and for which data on at least two waves were available from the same country. A total of 28 countries were included in the current study. The characteristics of each country including the survey year, country income level, response rate, and sample size are provided in Table S1 of the Appendix. The surveys included in the current study were conducted between 2003 and 2017 and were mainly from LMICs.

2.2. Perceived loneliness

Perceived loneliness was assessed with the question "During the past 12 months, how often have you felt lonely?" with answer options 'never', 'rarely', 'sometimes', 'most of the time', and 'always'. This variable was used as a binary variable dichotomized as never, rarely, sometimes (coded = 0) and most of the time, always (coded = 1) as in a previous GSHS publication (Glozah et al., 2018).

2.3. Statistical analysis

Statistical analyses were performed with Stata 14.2 (Stata Corp LP, College Station, Texas). The analysis was restricted to those aged 12–15 years since the majority of the students were within this age group, while information on the exact age outside of this age range was not available. The prevalence and 95%CI of perceived loneliness in the past 12 months was calculated for the overall sample and sex-stratified samples for each survey. Crude linear trends in perceived loneliness were examined by linear regression models across surveys within the same country to estimate regression coefficients (beta) and 95%CI for every one-year change. P for trends was estimated using the survey year as a continuous variable. We also conducted interaction analysis to assess whether there are differing trends between sex by including a product term (survey year × sex) in the model. Sampling weights and the clustered sampling design of the surveys were taken into account in all analyses.

3. Results

A total of 180,087 school-going adolescents aged 12–15 year from 28 countries were included in the analytical sample. The mean (SD) age was 13.7 (1.0) years and 51.4 % were females. The overall mean prevalence of perceived loneliness in the past 12 months was 10.7 % (boys 8.7 %, girls 12.6 %) but this varied widely across countries. Specifically, the lowest and highest prevalence was observed in Myanmar in 2007 (3.9 %) and Samoa in 2011 (23.3 %), respectively. The trends in the prevalence of perceived loneliness are shown in Table 1 and Fig. 1. Among the 28 countries included in the study, based on the overall sample, significant increasing and decreasing trends were observed in six counties each. No significant decreasing or increasing trends were observed in the remaining 16 countries. Significant increasing trends were observed in Namibia between 2004 (11.4 %) and 2013 (13.5 %) (beta = 0.23; 95% CI = 0.01,0.45), Anguilla between 2009 (9.1 %) and 2016 (12.9 %) (beta = 0.56; 95%CI = 0.20,0.91), Egypt between 2006 (7.9 %) and

Table 1
Trends in prevalence (%) of perceived loneliness in 28 countries (overall and by sex).

		Overall				Boys				Girls			
Country	Year	%	[95%CI]	beta	[95%CI]	%	[95%CI]	beta	[95%CI]	%	[95%CI]	beta	[95%CI]
AFR													
Benin	2009	15.3	[13.1,17.7]	−0.62*	[−1.16,−0.08]	15.5	[13.0,18.4]	−0.75	[−1.54,0.04]	14.7	[10.8,19.5]	−0.33	[−1.12,0.46]
	2016	10.9	[8.4,14.1]			10.3	[6.5,15.9]			12.4	[9.6,15.8]		
Namibia	2004	11.4	[10.5,12.4]	0.23*	[0.01,0.45]	10.2	[8.6,12.0]	0.05	[−0.27,0.36]	12.4	[11.0,13.9]	0.38*	[0.01,0.75]
	2013	13.5	[11.9,15.3]			10.6	[8.6,13.1]			15.8	[13.0,18.9]		
Seychelles[a]	2007	14.2	[13.7,14.7]	−0.34***	[−0.53,−0.16]	12.5	[12.0,13.0]	−0.56***	[−0.77,−0.34]	15.7	[14.7,16.6]	−0.11	[−0.42,0.19]
	2015	11.5	[10.1,12.9]			8.1	[6.6,9.9]			14.8	[12.7,17.1]		
AMR													
Anguilla	2009	9.1	[7.1,11.5]	0.56**	[0.20,0.91]	8.6	[6.00,12.2]	0.34	[−0.24,0.92]	9.3	[6.7,12.8]	0.82**	[0.33,1.31]
	2016	12.9	[10.7,15.6]			11.0	[7.7,15.6]			15.0	[12.0,18.7]		
Argentina	2007	10.3	[7.0,14.7]	−0.23	[−1.03,0.58]	6.2	[3.0,12.6]	−0.20	[−1.12,0.73]	13.8	[10.5,18.0]	−0.25	[−1.06,0.55]
	2012	9.1	[8.0,10.4]			5.3	[4.3,6.4]			12.5	[11.2,14.0]		
Guatemala	2009	9.3	[8.0,10.7]	−0.05	[−0.47,0.38]	6.4	[5.3,7.8]	−0.25	[−0.62,0.13]	12.0	[10.2,14.0]	0.22	[−0.37,0.80]
	2015	9.0	[7.1,11.3]			5.0	[3.4,7.2]			13.3	[10.6,16.4]		
Guyana	2004	15.8	[13.8,18.0]	0.24	[−0.32,0.81]	13.6	[10.9,16.8]	−0.01	[−0.82,0.79]	17.7	[15.1,20.7]	0.54	[−0.13,1.22]
	2010	17.3	[14.9,19.9]			13.5	[10.3,17.5]			21.0	[18.4,23.7]		
Jamaica	2010	17.2	[15.4,19.1]	−0.01	[−0.44,0.43]	12.4	[9.6,15.8]	0.04	[−0.63,0.71]	21.9	[18.7,25.6]	−0.09	[−0.76,0.59]
	2017	17.1	[15.0,19.5]			12.7	[9.7,16.3]			21.3	[18.6,24.4]		
Suriname	2009	14.2	[11.7,17.1]	0.24	[−0.29,0.77]	12.7	[9.2,17.4]	0.15	[−0.71,1.01]	15.0	[11.4,19.3]	0.39	[−0.33,1.12]
	2016	15.9	[13.7,18.3]			13.8	[10.2,18.4]			17.7	[15.0,20.8]		
Trinidad & Tobago	2007	10.9	[8.8,13.3]	0.25	[−0.08,0.58]	8.0	[5.8,11.0]	0.29	[−0.13,0.70]	13.7	[11.4,16.4]	0.19	[−0.17,0.55]
	2011	9.4	[7.9,11.1]			7.6	[5.7,10.1]			11.1	[8.9,13.8]		
	2017	13.2	[10.9,15.8]			10.7	[7.9,14.4]			15.3	[12.8,18.2]		
Uruguay	2006	6.6	[5.7,7.8]	0.01	[−0.23,0.24]	4.1	[3.3,5.2]	−0.06	[−0.31,0.19]	8.7	[7.0,10.6]	0.09	[−0.31,0.50]
	2012	6.7	[5.8,7.7]			3.8	[2.8,5.1]			9.2	[7.8,10.9]		
EMR													
Egypt	2006	7.9	[5.8,10.6]	1.29**	[0.49,2.08]	5.6	[4.3,7.3]	1.38*	[0.16,2.60]	10.3	[7.2,14.5]	1.15*	[0.15,2.16]
	2011	14.3	[11.5,17.7]			12.5	[7.8,19.5]			16.1	[13.0,19.7]		
Jordan	2004	15.8	[14.0,17.8]	−0.35	[−1.63,0.93]	11.1	[8.5,14.4]	−0.43	[−1.69,0.82]	20.1	[18.1,22.3]	−0.34	[−2.13,1.45]
	2007	14.7	[11.9,18.2]			9.8	[8.0,12.0]			19.1	[14.8,24.2]		
Kuwait	2011	18.5	[16.1,21.1]	0.15	[−0.96,1.25]	13.8	[10.9,17.3]	0.36	[−1.11,1.83]	23.4	[20.2,26.9]	−0.10	[−1.57,1.36]
	2015	19.1	[15.9,22.7]			15.2	[11.2,20.5]			23.0	[18.8,27.8]		
Lebanon[a]	2005	11.3	[10.1,12.7]	−0.13	[−0.28,0.02]	7.1	[5.9,8.5]	0.04	[−0.12,0.20]	15.1	[13.5,17.0]	−0.29**	[−0.49,−0.09]
	2011	12.1	[10.3,14.2]			8.4	[6.2,11.4]			15.4	[13.3,17.7]		
	2017	9.8	[8.7,11.1]			7.7	[6.5,9.2]			11.8	[10.3,13.5]		
Morocco	2006	15.5	[13.8,17.4]	0.05	[−0.15,0.26]	11.6	[9.4,14.2]	0.11	[−0.18,0.40]	19.7	[17.5,22.1]	−0.04	[−0.31,0.24]
	2010	16.4	[14.0,19.1]			12.1	[9.9,14.7]			21.2	[17.9,24.8]		
	2016	16.2	[15.1,17.3]			12.7	[11.1,14.6]			19.6	[18.2,21.2]		
United Arab Emirates	2005	13.9	[13.2,14.7]	−0.20**	[−0.34,−0.06]	11.7	[10.7,12.7]	−0.22*	[−0.40,−0.04]	15.9	[14.8,17.1]	−0.17	[−0.44,0.10]
	2010	15.8	[13.7,18.1]			14.6	[11.6,18.2]			16.6	[14.0,19.5]		
	2016	12.0	[10.7,13.4]			9.6	[8.0,11.4]			14.2	[11.8,17.0]		
SEAR													
Indonesia	2007	8.6	[7.7,9.5]	−0.32***	[−0.46,−0.18]	6.8	[5.8,8.1]	−0.21*	[−0.39,−0.04]	10.3	[9.1,11.7]	−0.43***	[−0.63,−0.23]
	2015	6.0	[5.4,6.6]			5.1	[4.5,5.9]			6.8	[6.0,7.8]		
Maldives	2009	13.8	[12.3,15.5]	0.45*	[0.00,0.90]	11.7	[9.2,14.6]	−0.06	[−0.83,0.72]	15.6	[13.5,17.9]	0.80*	[0.13,1.48]
	2014	16.1	[14.6,17.7]			11.4	[8.9,14.5]			19.6	[17.2,22.3]		
Myanmar[a]	2007	3.9	[2.6,5.8]	0.46***	[0.22,0.70]	4.1	[2.4,7.1]	0.21	[−0.12,0.54]	3.6	[2.6,5.1]	0.68***	[0.39,0.96]
	2016	8.0	[6.8,9.5]			6.0	[4.4,8.1]			9.7	[7.7,12.1]		

(*continued on next page*)

Table 1 (*continued*)

		Overall				Boys				Girls			
Country	Year	%	[95%CI]	beta	[95%CI]	%	[95%CI]	beta	[95%CI]	%	[95%CI]	beta	[95%CI]
Sri Lanka	2008	7.3	[6.2,8.6]	0.02	[−0.20,0.23]	7.8	[6.5,9.3]	−0.09	[−0.37,0.19]	6.7	[5.1,8.8]	0.11	[−0.19,0.41]
	2016	7.5	[6.4,8.7]			7.1	[5.6,9.0]			7.6	[6.3,9.2]		
Thailand	2008	7.9	[6.4,9.8]	0.26	[−0.07,0.59]	7.9	[6.2,9.9]	0.40*	[0.03,0.78]	7.9	[6.1,10.2]	0.12	[−0.29,0.53]
	2015	9.8	[8.3,11.4]			10.7	[9.1,12.6]			8.7	[7.0,10.9]		
WPR													
Cook Islands	2011	7.6	[6.0,9.6]	0.37	[−0.39,1.13]	5.8	[3.9,8.5]	0.35	[−0.40,1.11]	9.3	[6.9,12.5]	0.23	[−0.92,1.37]
	2015	9.1	[6.5,12.5]			7.3	[4.9,10.8]			10.4	[6.7,15.7]		
Fiji	2010	12.9	[11.2,14.8]	−0.16	[−0.62,0.31]	11.6	[9.1,14.7]	−0.08	[−0.76,0.60]	14.0	[12.3,15.9]	−0.26	[−0.86,0.35]
	2016	12.0	[10.2,14.1]			11.2	[8.7,14.2]			12.5	[9.8,15.8]		
Philippines[a]	2003	9.7	[8.4,11.2]	0.29**	[0.10,0.48]	9.4	[7.8,11.2]	0.04	[−0.15,0.22]	9.9	[8.1,12.1]	0.56***	[0.29,0.82]
	2007	17.2	[15.8,18.7]			12.6	[10.7,14.9]			20.8	[18.7,23.0]		
	2011	14.0	[12.9,15.3]			11.5	[10.2,13.0]			16.2	[14.2,18.4]		
	2015	15.5	[13.8,17.2]			11.0	[9.6,12.5]			19.6	[17.3,22.1]		
Samoa	2011	23.3	[21.6,25.1]	−2.55***	[−2.96,−2.13]	23.5	[20.8,26.4]	−2.66***	[−3.26,−2.06]	22.2	[20.3,24.2]	−2.29***	[−2.80,−1.77]
	2017	8.0	[6.5,9.8]			7.5	[5.7,9.9]			8.5	[6.5,11.1]		
Tonga[a]	2010	16.3	[14.2,18.7]	−0.49*	[−0.88,−0.11]	17.7	[14.5,21.6]	−0.91**	[−1.50,−0.32]	14.8	[12.6,17.4]	−0.03	[−0.46,0.39]
	2017	12.9	[11.5,14.4]			11.4	[9.4,13.6]			14.6	[13.0,16.4]		
Vanuatu	2011	6.7	[5.4,8.2]	0.44	[−0.06,0.93]	6.3	[4.1,9.5]	0.62	[−0.17,1.40]	7.3	[5.7,9.2]	0.26	[−0.44,0.96]
	2016	8.9	[7.1,11.0]			9.4	[7.0,12.5]			8.6	[6.1,12.0]		

Abbreviation: CI Confidence interval; AFR African Region; AMR Region of the Americas; EMR Eastern Mediterranean Region; SEAR South-East Asia Region; WPR Western Pacific Region.
The beta values are based on linear regression including the survey year as a continuous variable. The beta can be interpreted as the average percentage point change in prevalence per year.

[a] Significant interaction by sex (i.e., $P < 0.05$).

* P for trend<0.05.

** P for trend <0.01.

*** P for trend <0.001.

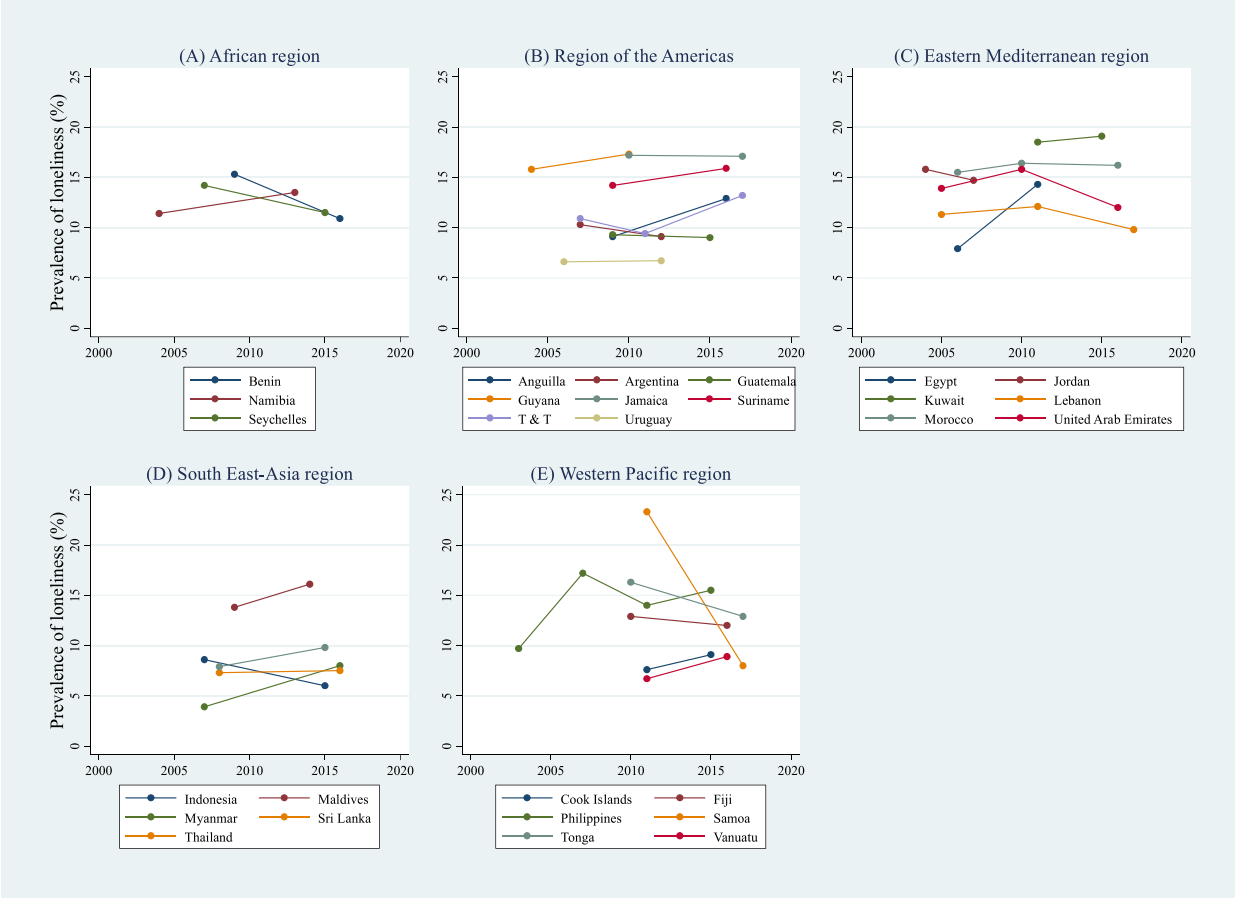

Fig. 1. Prevalence of perceived loneliness (%) across years by region and country.
Abbreviation: T & T Trinidad & Tobago.
The analysis is based on the overall sample including both boys and girls.

2011 (14.3 %) (beta = 1.29; 95%CI = 0.49,2.08), Maldives between 2009 (13.8 %) and 2014 (16.1 %) (beta = 0.45; 95%CI = 0.00,0.90), Myanmar between 2007 (3.9 %) and 2016 (8.0 %) (beta = 0.46; 95%CI = 0.22,0.70), and Philippines between 2003 (9.7 %) and 2015 (15.5 %) (beta = 0.29; 95%CI = 0.10,0.48). The beta can be interpreted as the average point change in prevalence (%) per year. In contrast, significant decreasing trends were observed in Benin between 2009 (15.3 %) and 2016 (10.9 %) (beta = −0.62; 95%CI = −1.16,−0.08), Seychelles between 2007 (14.2 %) and 2015 (11.5 %) (beta = −0.34; 95%CI = −0.53,−0.16), United Arab Emirates between 2005 (13.9 %) and 2016 (12.0 %) (beta = −0.20; 95%CI = −0.34,−0.06), Indonesia between 2007 (8.6 %) and 2015 (6.0 %) (beta = −0.32; 95%CI = −0.46,−0.18), Samoa between 2011 (23.3 %) and 2017 (8.0 %) (beta = −2.55; 95%CI = −2.96,−2.13), and Tonga between 2010 (16.3 %) and 2017 (12.9 %) (beta = −0.49; 95%CI = −0.88,−0.11). Significant interaction by sex in the trend in perceived loneliness was observed in five countries (Seychelles, Lebanon, Myanmar, Philippines, Tonga; Table 1 and Fig. 2). Specifically, significant decreasing trends were only observed among boys in Seychelles and Tonga, while significant increasing trends were only seen among girls in Myanmar and the Philippines. Finally, a significant decreasing trend was only observed among girls in Lebanon.

4. Discussion

4.1. Main findings

In the present study including large nationally representative samples of school-going adolescents aged 12–15 years in 28 countries from Africa, Asia, and the Americas, which were predominantly LMICs, significant increasing trends in perceived loneliness were observed in six countries (Namibia, Anguilla, Egypt, Maldives, Myanmar, and Philippines), while significant decreasing trends were also observed in six countries (Benin, Seychelles, United Arab Emirates, Indonesia, Samoa, and Tonga). In the remaining countries, trends in perceived loneliness were stable but remained mostly high. Egypt experienced the greatest increase in perceived loneliness between 2006 (7.9 %) and 2011 (14.3 %), whereas Samoa experienced the greatest decline in perceived loneliness between 2011 (23.3 %) and 2017 (8.0 %). Interestingly, differences in trends were observed by sex in five countries with trends in perceived loneliness often being less favorable among girls. To the best of our knowledge, this is the first study on general perceived loneliness trends among adolescents with data from multiple continents, including countries for which trends were unknown.

4.2. Interpretation of findings

Declining trends in perceived loneliness were observed in six countries. However, apart from Samoa, the rate of decline was modest. These declining trends may be explained by the implementation of national policies to improve the wellbeing of young people. For example, in Samoa in 2010, the Policy for Children was introduced that applies to relevant individuals, organizations – both government and non-government, institutions, communities and civil society organizations whose involvement, relations or actions may impact children 0–18 years of age. The policy is also linked to the work, policies and strategies of all the relevant sectors of Government such as Health, Education, Law and

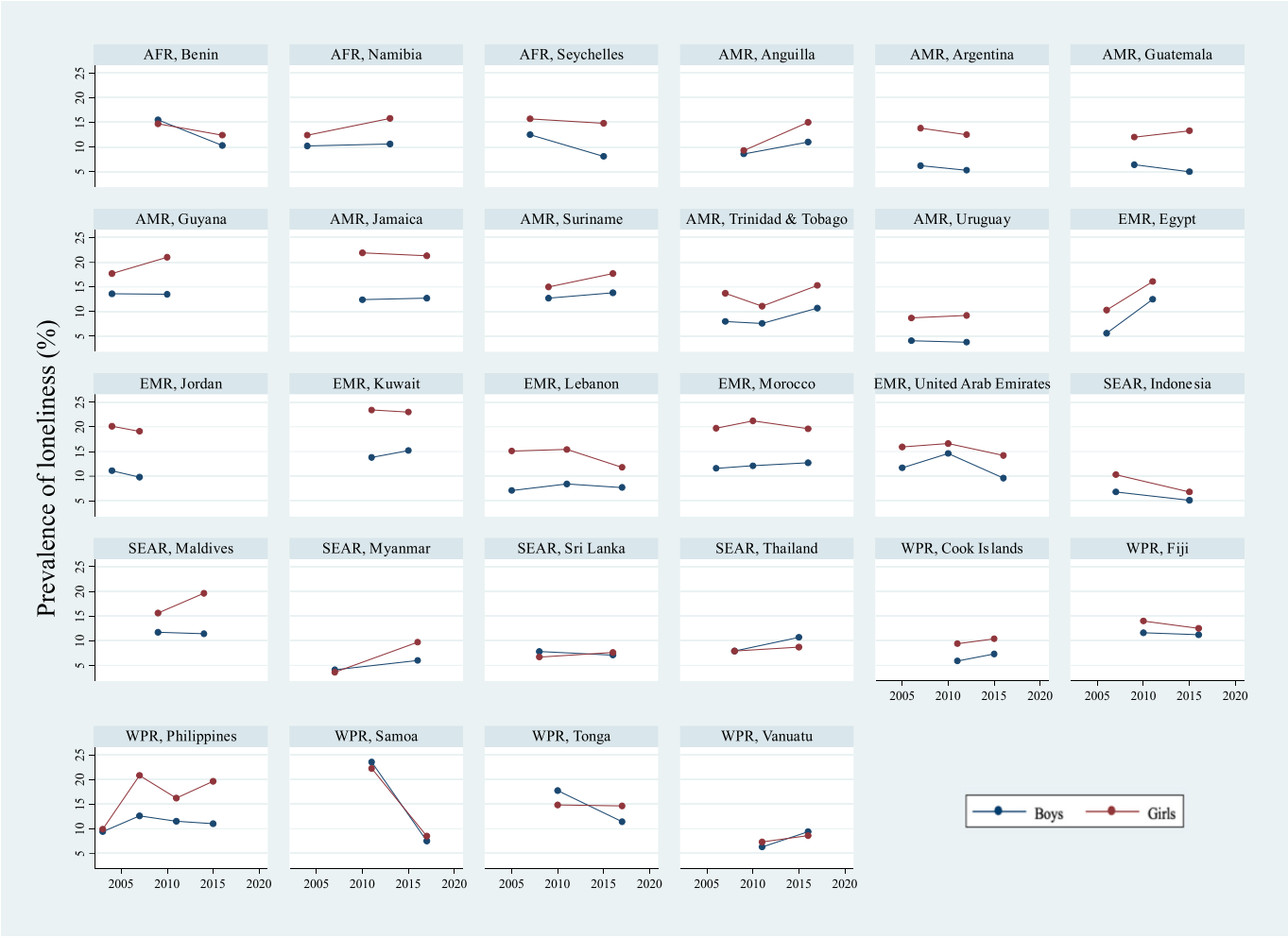

Fig. 2. Prevalence of perceived loneliness (%) across years by sex, country, and region.
Abbreviation: AFR African Region; AMR Region of the Americas; EMR Eastern Mediterranean Region; SEAR South-East Asia Region; WPR Western Pacific Region.

Justice and Finance for young people to realize their full potential and to get the support they need to thrive, grow, and prosper. Ultimately, the overall goal of the policy is to protect and improve the quality of life for all children equitably within the social and cultural environmental context of Samoa with the following vision "*For every child in Samoa to grow up in settings where they are nurtured in body, mind and spirit and have the freedom to enjoy all human rights; to develop to the fullest potential within environments that invite learning and leisure; to be protected from the harm of any kind and to participate fully within family, cultural and social ways of life*" (World Health Organization, 2010). It is plausible to speculate that such broad-ranging policy with an emphasis on social participation acted toward the reduction in feeling of loneliness among adolescents. For example, it has been proposed that interventions fostering social connectedness at school may prevent feelings of loneliness (Santini et al., 2021). Moreover, during the study period, Samoa implemented several initiatives to address youth bullying. For example, The Ministry of Police and Prisons carried out educational awareness programmes for children in schools on preventing alcohol and drug abuse, bullying, street fights and cybercrime (UNICEF, 2017). Indeed, bullying has been identified as a risk factor for perceived loneliness (Bayat et al., 2021), and thus, such targeted initiatives may have also contributed to a reduction of feelings of loneliness in Samoa. Tonga also experienced a decline in perceived loneliness in adolescents. Interestingly, in Tonga, the National Youth Strategy was adopted in 2007 with the following vision "*the young people of Tonga have strengths and talents and must be given the opportunities to exploit them for their benefit and well-being as well as the improvement of their families and communities*" (Youthpolicy.org, 2014). It is again plausible to speculate that national youth strategies that focus on improvements in families and communities may have had beneficial effects on the reduction of loneliness. It is important to note though, to the best of the authors' knowledge, policies to specifically address loneliness among adolescents are very scarce.

While it is encouraging that perceived loneliness decreased in six countries, it is also concerning that it increased in an equal number of countries. The greatest increase in perceived loneliness was observed in Egypt, and this may be owing to factors such as social unrest. For instance, the Egypt Uprising of 2011 (Duignan, 2023) could have negatively impacted social cohesion and connections, potentially resulting in increasing feelings of loneliness among the adolescent population. Similarly, Myanmar experienced an increase in feelings of loneliness among adolescents, and this could be explained by the significant social unrest during the times of the survey (Marciel, 2022). Another reason for an increase in feelings of loneliness, particularly in Egypt, may be owing to a rapid increase in social media use during the study period (Mubarak, 2011). Indeed, social media use has been associated with feelings of loneliness among adolescents (Azhari et al., 2022).

The finding on the sex differences, where the perceived loneliness trend was less favorable among girls than boys in general, is also interesting and supports findings from the multi-country study focusing on in-school loneliness (Twenge et al., 2021). While the underlying reason for this finding is unknown, it has been proposed that one

contributing factor may be that of social media (Twenge et al., 2021). Indeed, social media may create an exclusionary culture that increases perceived loneliness, particularly among girls (Luby and Kertz, 2019; Viner et al., 2019). Moreover, digital media favors shallow ties rather than deep ones, which may result in feelings of loneliness (Sherman et al., 2013).

4.3. Implications of the study findings

Findings from the present study propose that action is required in many countries to address increasing or stable and high levels of perceived loneliness among the adolescent population. Several interventions that aim to reduce perceived loneliness have been proposed. For example, items such as the following could be implemented into any national policy to combat youth perceived loneliness: guarantee access to a center offering a range of activities; guarantee that all children have the basics they need to succeed in education and commit to reducing childhood poverty; include schools in policy delivery; train parents and guardians on the core signs of loneliness in young people; establish helplines etc. that can offer assistance (Mental Health Foundation, 2021). A recent systematic review on interventions to reduce feeling of loneliness among adolescents found that successful interventions included components that promoted social skills, social support, social interaction and incorporated psychological interventions (Eccles and Qualter, 2021). Thus, policies or intervention developed to target perceived loneliness should consider the incorporation of such components.

4.4. Strengths and limitations

The large representative samples of school-going adolescents from 28 countries across multiple continents are clear strengths of the present study. However, findings must be interpreted in light of the study's limitations. First, loneliness was self-reported, potentially introducing reporting bias (e.g., social desirability bias, recall bias) into the findings. Relatedly, perceived loneliness was assessed with a single-item question. While questionnaires with multiple items to assess perceived loneliness could be ideal, it has been argued that using extreme categories (as in our case) to define perceived loneliness could produce prevalence figures which are similar to those based on multiple items (Victor et al., 2012). Next, given that our study only included adolescents who attend school, our study results may not be generalizable to adolescents who do not attend school. Finally, given that the survey years differed between countries, it is important to note that the results from the regression analysis are not totally comparable across countries, and that they should always be interpreted in conjunction with the years in which the surveys were conducted.

5. Conclusion

In the present study including large representative samples of adolescents from 28 countries in Africa, Asia, and the Americas (predominantly LMICs), it was observed that trends in perceived loneliness increased and decreased in six countries each while in the remaining countries, levels of perceived loneliness generally remained stable and high. It would be prudent to implement nation-wide policies to combat levels of perceived loneliness globally.

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CRediT authorship contribution statement

All authors have made a substantial, direct and intellectual contribution to the work. All authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

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Ethics

All GSHS surveys were approved, in each country, by both a national government administration (most often the Ministry of Health or Education) and an institutional review board or ethics committee. Student privacy was protected through anonymous and voluntary participation, and informed consent was obtained as appropriate from the students, parents and/or school officials.

Declaration of competing interest

None.

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References

Azhari, A., Toms, Z., Pavlopoulou, G., Esposito, G., Dimitriou, D., 2022. Social media use in female adolescents: associations with anxiety, loneliness, and sleep disturbances. Acta Psychol. 229, 103706.
Bayat, N., Fokkema, T., Mujakovic, S., Ruiter, R.A.C., 2021. Contextual correlates of loneliness in adolescents. Child Youth Serv. Rev. 127, 106083.
Clark, D.M.T., Loxton, N.J., Tobin, S.J., 2015. Declining loneliness over time: evidence from American colleges and high schools. Personal. Soc. Psychol. Bull. 41, 78–89.
Duignan, B., 2023. Egypt uprising of 2011 [WWW document], Encycl. Br.. https://www.britannica.com/event/Egypt-Uprising-of-2011.
Eccles, A.M., Qualter, P., 2021. Alleviating loneliness in young people–a meta-analysis of interventions. Child Adolesc. Mental Health 26, 17–33.
Ernst, J.M., Cacioppo, J.T., 1999. Lonely hearts: psychological perspectives on loneliness. Appl. Prev. Psychol. 8, 1–22.
Glozah, F.N., Oppong Asante, K., Kugbey, N., 2018. Parental involvement could mitigate the effects of physical activity and dietary habits on mental distress in Ghanaian youth. PLoS One 13, e0197551.
Hawkley, L.C., 2022. Loneliness and health. Nat. Rev. Dis. Primers 8, 22.
Hawkley, L.C., Cacioppo, J.T., 2010. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. Ann. Behav. Med. 40, 218–227.
Hawkley, L.C., Capitanio, J.P., 2015. Perceived social isolation, evolutionary fitness and health outcomes: a lifespan approach. Philos. Trans. R. Soc. B: Biol. Sci. 370, 20140114.
Luby, J., Kertz, S., 2019. Increasing suicide rates in early adolescent girls in the United States and the equalization of sex disparity in suicide: the need to investigate the role of social media. JAMA Netw. Open 2, e193916.
Madsen, K.R., Holstein, B.E., Damsgaard, M.T., Rayce, S.B., Jespersen, L.N., Due, P., 2019. Trends in social inequality in loneliness among adolescents 1991–2014. J. Public Health 41, e133–e140.
Marciel, S., 2022. It's time to help Myanmar's resistance prevail [WWW Document], United States Inst. Peace. https://www.usip.org/publications/2022/08/its-time-help-myanmars-resistance-prevail.
Mental Health Foundation, 2021. Loneliness in young people: policy recommendations. https://www.mentalhealth.org.uk/our-work/public-engagement/unlock-loneliness/policy-recommendations (accessed 11.10.23).
Mubarak, A., 2011. Two million Egyptians joined Facebook since the revolution [WWW document], Egypt Indep.. https://www.egyptindependent.com/two-million-egyptians-joined-facebook-revolution/.
Santini, Z.I., Pisinger, V.S.C., Nielsen, L., Madsen, K.R., Nelausen, M.K., Koyanagi, A., Koushede, V., Roffey, S., Thygesen, L.C., Meilstrup, C., 2021. Social disconnectedness, loneliness, and mental health among adolescents in Danish high schools: a nationwide cross-sectional study. Front. Behav. Neurosci. 15, 632906.
Sherman, L.E., Michikyan, M., Greenfield, P.M., 2013. The effects of text, audio, video, and in-person communication on bonding between friends. Cyberpsychology 7, 3.
Solmi, M., Veronese, N., Galvano, D., Favaro, A., Ostinelli, E.G., Noventa, V., Favaretto, E., Tudor, F., Finessi, M., Shin, J. Il, 2020. Factors associated with loneliness: an umbrella review of observational studies. J. Affect. Disord. 271, 131–138.
Stickley, A., Koyanagi, A., Koposov, R., Schwab-Stone, M., Ruchkin, V., 2014. Loneliness and health risk behaviours among Russian and US adolescents: a cross-sectional study. BMC Public Health 14, 1–12.

Surkalim, D.L., Luo, M., Eres, R., Gebel, K., van Buskirk, J., Bauman, A., Ding, D., 2022. The prevalence of loneliness across 113 countries: systematic review and meta-analysis. BMJ 376.
Twenge, J.M., Haidt, J., Blake, A.B., McAllister, C., Lemon, H., Le Roy, A., 2021. Worldwide increases in adolescent loneliness. J. Adolesc. 93, 257–269.
UNICEF, 2017. Situation analysis of children in Samoa [WWW Document]. https://www.unicef.org/pacificislands/media/1206/file/Situation-Analysis-of-Children-Samoa.pdf (accessed 7.15.23).
Victor, C.R., Burholt, V., Martin, W., 2012. Loneliness and ethnic minority elders in Great Britain: an exploratory study. J. Cross Cult. Gerontol. 27, 65–78.
Viner, R.M., Gireesh, A., Stiglic, N., Hudson, L.D., Goddings, A.-L., Ward, J.L., Nicholls, D.E., 2019. Roles of cyberbullying, sleep, and physical activity in mediating the effects of social media use on mental health and wellbeing among young people in England: a secondary analysis of longitudinal data. Lancet Child Adolesc. Health 3, 685–696.
World Health Organization, 2010. National Policy for Children of Samoa [WWW Document]. https://extranet.who.int/mindbank/item/4709 (accessed 7.15.23).
Youthpolicy.org, 2014. Factsheet: Tonga [WWW Document]. https://www.youthpolicy.org/factsheets/country/tonga/ (accessed 7.15.23).