1   **Mental health status of the European population and its determinants: a cross-national**

2   **comparison study**

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26 **ABSTRACT**

27 **BACKGROUND**

28   This study aimed to provide an up-to-date cross-national comparison of the European

29 population mental health (MH) *status* and its *determinants*.

30 **METHODS**

31   For the European Union (EU) 27 countries and the UK 6 Key Performance Indicators

32 (KPIs) in *MH status* (e.g., prevalence of mental disorders) and 19 KPIs in individual (e.g.,

33 smoking), environmental (e.g., air pollution) and socioeconomic (e.g., poor housing

34 conditions) *determinants of MH* were measured. KPIs scores were standardised in a 1-10

35 Likert Scale (1: worst performance; 10: best performance), thus allowing between-country

36 comparisons of the relative performance. Exploratory unadjusted bivariate correlations

37 between KPIs-transformed scores were run.

38 **RESULTS**

39   Based on the KPIs-transformed scores, Slovakia (8.3), Cyprus (7.8) and Greece (7.1)

40 had the best MH status, while Sweden (3.1), UK (2.6) and The Netherlands (2.1) had the

41 poorest MH status. Regarding determinants of MH Finland (8.0), Sweden and Estonia (7.5)

42 had the lowest MH risk, while France (3.1) and Romania (2.8) had the highest risk.

43   Smoking (r=-0.43, p=.021), alcohol use (r=0.57, p=.002), daylight hours (r=0.74,

44 p<.001), ecoanxiety (r=-0.51, p=.005), air pollution (r=-0.46, p=.015), commuting time

45 (r=0.42, p=.026) and Fragile State Index (r=-0.44, p=.018) correlated with overall MH status.

46 **CONCLUSIONS**

47   Population-level MH *status* and its *determinants* varied across European countries,

48 including 'low-risk, poor MH status' and 'high-risk, good MH status' countries. Further non-

49 tested determinants of MH and/or between-country differences in responsiveness to MH

50 needs may explain this discrepancy. These results should guide future evidence-based

51 public MH policymaking and universal preventive strategies in Europe.

52 **Key words.** Mental health status, mental health determinants, Europe.

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55 **<u>INTRODUCTION</u>**

56   The past few years have witnessed an unprecedented mental health (MH) crisis

57 across the world [1,2]. This challenging scenario has impeded progress towards achieving

58 goals of global initiatives from the United Nations Sustainable Development Goal [3], the

59 World Health Organization (WHO) [4] and the World Psychiatric Association (WPA) [5] aimed

60 to promote MH and well-being.

61   Mental disorders have been linked to negative health and social outcomes [6]. Prior to

62 the COVID-19 pandemic MH-related annual costs to society amounted to over EUR 600

63 billion (i.e., more than 4% of the Gross Domestic Prodcut) across the 28 European Union

64 (EU) countries, being the direct healthcare costs (EUR 190 billion) lower than the indirect

65 costs due to unemployment and lost productivity (EUR 260 billion) [7]. Most importantly,

66 patients with mental disorders [8], especially schizophrenia [9], were reported to have a 15-

67 20-year shorter life expectancy than the general population. Of concern, most MH patients

68 do not receiving appropriate care [4,10]; and the treatment gap [11] seems to have widened

69 after the pandemic [12].

70   In the EU prior to the COVID-19 pandemic 84 million (1 in 6 people) suffered from a

71 mental disorder [13], which rose to almost 1 in 2 Europeans (46%) after this period [13], in

72 spite of changes in MH services [14,15]. The European population's significant decline in MH

73 has been largely attributed to the so-called *polycrisis*, that is, a perfect storm through the

74 combination of adverse economic (e.g., economic recession), social (e.g., poor housing),

75 geopolitical (e.g., Ukraine War) and environmental (e.g., climate change) risk factors of MH

76 [16]. On the other hand, preventive psychiatry and public MH have increasingly gained

77 traction over the past few years [17–20] and previous studies from our group identified some

78 key modifiable MH risk factors [17,21]. Hence, a better understanding of the population MH

79 status and its determinants across European countries is critical for developing targeted

80 preventive interventions aimed at improving Europeans' MH status.

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81   Within this context, the 2023 Headway Initiative (see below) collected and analysed

82   data on 54 MH-related key performance indicators (KPIs) across EU-27 countries and the

83   UK. Based on these data, this study aimed to provide a cross-national comparison of the

84   population MH *status* and its individual, environmental and social *determinants*.

85   **<u>METHODS</u>**

86   **The Headway Initiative**

87   The Headway Initiative (hereafter, referred to as Headway) was launched by the

88   Italian Think Tank The European House – Ambrosetti in partnership with Angelini Pharma in

89   2018, who also designed the Headway Mental Health Index 3.0 detailed below, which was

90   presented to the European Parliament on 25 October 2023. In particular, by building upon

91   the EU principle of "Health in All Policies", the Headway project aimed to get new insights

92   into the current MH status and its determinants across the 27 EU countries and the UK as

93   well as their responsiveness in healthcare, workplaces, schools and society (Arango et al.,

94   this issue). Numerous multidisciplinary debates on social and health policies took place,

95   which were led by more than 40 experts from the medical-scientific community and involved

96   patient and family associations representatives, health economists and other relevant

97   stakeholders [16].

98   **The 2023 Headway Mental Health Index 3.0: key performance indicators, variables and**

99   **data source**

100   The 2023 Headway Mental Health Index 3.0 [16] consists of 4 subindices and 54

101   KPIs in three domains: i) *Determinants* of MH (19 KPIs), ii) Mental Health *status* of the

102   population (6 KPIs) and iii) *Responsiveness* to MH needs in healthcare (14 KPIs),

103   workplaces, schools and society in general (15 KPIs). Some KPI included a set of variables

104   selected through expert consensus meetings and data came from official open-access

105   datasets. Table 1 and Table 2 summarise the KPIs related to MH status and its

106   determinants, respectively, including the variable(s) in each KPI, the measure and data

107   source, all of which were official, authoritative and open-access datasets (e.g., Eurostat,

108   OECD, WHO).

4

109 **Insert Table 1 here**

110 **Insert Table 2 here**

111 First, for each variable a maximum score (10) and a minimum score (1) was assigned

112 to the best and worst performing countries, respectively. Second, for each country with an

113 intermediate performance a score ranging from 1 to 10 was assigned as detailed below, thus

114 making the *relative* performance of each country comparable across the board.

115 *scale = (best performer - worst performer) / (max score - min score)*

116 *score = [(value of Country$_i$ - worst performer) / scale + 1]*

117 When the KPI was composed of multiple sub-indicators (or variables), the score was

118 assigned to each sub-indicator. The final score was calculated as the average of the scores

119 on the sub-indicators. After calculating the score for each KPI, a score was assigned for each

120 area based on the average of the KPI scores, weighted by the assigned weights. For MH

121 status KPIs higher scores indicated "better" MH (e.g., lower prevalence of mental disorders

122 or suicide rates). Regarding determinants of MH higher KPI scores indicated lower risk (e.g.,

123 lower prevalence of alcohol use) and vice versa.

124 6 KPIs in MH *status* included i) *prevalence* and ii) *incidence* of depression, autism

125 spectrum disorders, anxiety, schizophrenia, bipolar disorder and, only for under-20

126 individuals, attention-deficit hyperactivity disorder (ADHD), conduct disorder and learning

127 disability; iii) *years lived with disability* (YLDs) for the general population and iv) for under-20

128 individuals, v) MH-related *mortality* and vi) *suicide* rates (Table 1).

129 19 KPIs in *determinants* of MH encompassed 5 individual (smoking, alcohol, drugs

130 use, sexual abuse and bullying), 10 environmental (hours of daylight, temperature increase,

131 economic damage by extreme weather events, natural disasters, ecoanxiety, air and noise

132 pollution, transport and road traffic, urban green space and commuting time) and 4

133 socioeconomic factors (Fragile State Index, poor housing, overcrowding rate and crime level)

134 (Table 2).

135 Figure 1 shows the interrelationships between individual, environmental and

136 socioeconomic determinants of MH.

5

137   **Insert Figure 1 here**

138 **Statistics**

139   For descriptive purposes all KPIs scores of the EU-27+UK countries ordered

140 alphabetically were reported. Bivariate correlations explored potential associations between

141 KPIs scores, which were reported as Pearson coefficients and the corresponding p-value

142 since all Headway-transformed KPIs scores, which ranged from 1 to 10, followed a normal

143 distribution. Given the exploratory nature, these analyses were not corrected for multiple

144 testing or adjusted for potential confounders. For all the above analyses, which were

145 performed with the Statistical Package for Social Science version 25.0 (SPSS Inc., Chicago,

146 IL, USA), a two-tailed significance level was set at p <.05.

147 **RESULTS**

148 **Mental Health Status across European countries**

149   MH status KPIs scores are detailed in Table 3. Overall MH status scores showed

150 Slovakia (8.3), Cyprus (7.8) and Greece (7.1) to achieve the best performance, while The

151 Netherlands (2.1), the UK (2.6) and Sweden (3.1) had the poorest MH status.

152   **Insert Table 3 here**

153   The raw data on MH status variables for the above KPIs are provided in the online

154 supplementary material, namely the prevalence (Table S1) and incidence (Table S2) of the

155 above mental disorders and MH-related mortality and suicide rates (Table S3).

156 **Determinants of Mental Health across European countries**

157   Headway-transformed   scores   on   KPIs   in   individual,   environmental   and

158 socioeconomic determinants of MH are detailed in Table 4.

159   **Insert Table 4 here**

160 ***Individual determinants***

161   Sweeden (10), Cyprus (9.2) and Malta (7.7) were the lowest MH risk countries,

162 whereas Germany (1.0), Denmark (1.8) and Bulgaria (2.4) had the highest risk. In the online

163 supplementary material, we have provided the raw data (Table S4) and the Headway-

164 transformed KPI scores (Table S5).

6

165 ***Environmental determinants***

166   Estonia (10), Cyprus and Finland (9.6) had the lowest MH risk, whereas Greece (1.0),

167 Romania (2.3) and France (2.4) had the highest risk. The full raw data (Table S6) and

168 Headway-transformed KPI scores (Table S7) are available in the online supplementary

169 material.

170 ***Socioeconomic determinants***

171   The Netherlands (10), Malta (8.4) and Ireland (8.3) had the lowest MH risk, while

172 Latvia (1.0), Greece (2.0) and Croatia (2.3) had the highest risk. See the online

173 supplementary material for further details of the raw data (Table S8) and Headway-

174 transformed KPI scores (Table S9).

175 ***Overall scores***

176   Overall, Finland (8.0), Estonia (7.5) and Sweeden (7.5) showed the most favourable

177 determinants of MH (i.e., the lowest MH risk), while Romania (2.8), France (3.1) and Greece

178 (3.3) had the highest MH risk.

179 **Relationship between status and determinants of mental health**

180   In Table 4 we have also added data on overall status KPIs scores (right column). By

181 using a traffic light colours system and comparing the colour in determinants and status KPIs

182 global scores five clusters of countries were found as follows: i) "Red-Red" - 'High risk, poor

183 MH': the UK; ii) "Green-Green" - 'Low risk, good MH: Cyprus, Malta; iii) "Red-Green" - 'High

184 risk, good MH': Bulgaria, Croatia, Romania, Greece, Italy, Latvia; iv) "Green-Red" – 'Low risk,

185 poor MH': Ireland, Lithuania, The Netherlands, Sweden, Hungary; and v) "Any Yellow" –

186 'Medium risk, average MH': Austria, Belgium, Czechia, Denmark, Estonia, Finland, France,

187 Germany, Luxembourg, Poland, Portugal, Slovenia, Slovakia, Spain.

188   At an exploratory level, we ran unadjusted bivariate correlations between

189 determinants and status global KPIs scores, which are detailed in Table 5. Smoking (r = -

190 0.43, p = .021), alcohol (r = 0.57, p = .002), hours of daylight (r = 0.73, p <.001), ecoanxiety (r

191 = -0.51, p = .005), air pollution (r = -0.46, p = .015), commuting time (r = 0.42, p = .026) and

192 Fragile State Index (r = -0.44, p = .018) correlated with an overall measure of MH status.

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193   **Insert Table 5 here**

194   **DISCUSSION**

195   **Principal findings**

196   This first Headway-based study aimed to carry out a comparison of the population MH

197   *status* and its *determinants* across European countries. Two main findings emerged from the

198   analyses. First, as expected, there were relevant differences in the population MH status and

199   its determinants across European countries. Second, somehow surprising, for up to 11

200   countries MH status differed from what a determinants-based risk assessment appeared to

201   suggest, including both 'low risk, poor MH status' and 'high risk, good MH status' countries.

202   Thus, Slovakia and Cyprus emerged as the "healthiest" countries, whereas Finland, Sweden

203   and Estonia were the lowest risk countries according to the MH determinants KPIs. In brief,

204   between-country differences in their responsiveness to the population MH needs may, in

205   large part, explain this discrepancy, which forms the basis for the second Headway article in

206   this issue.

207   **Mental health status of the European population**

208   A deeper theoretical debate about the conceptualization of MH, although still

209   warranted [22,23], falls outside the scope of this article. This noted, Slovakia, Cyprus and

210   Greece emerged as the countries with the best population MH status, whereas Sweden, the

211   UK and The Netherlands had the poorest MH status. However, much caution is needed

212   when interpreting these results, which take into account multiple variables and may have

213   been affected by misreporting issues. Specifically, it is worth noting that those countries with

214   worse MH status could just reflect better quality of data/reporting, which appears to apply to

215   those countries with greater MH expenditure, such as Scandinavian countries.

216   Of concern, the COVID-19 pandemic triggered a 25% increase in prevalence of

217   anxiety and depressive disorders [4], with a prevalence of anxiety ranging from 4.3%

218   (Estonia) to 11.3% (Portugal) and a prevalence of depression ranging from 4.2% (Slovakia)

219   to 7.5% (Spain). The prevalence of schizophrenia, however, was showed to have a much

8

220   smaller variation (0.5% in The Netherlands vs. 0.3% in Denmark) compared with between-

221   country differences in the incidence of first-episode psychosis [24].

222   Over the past three decades data from the Global Burden of Disease project have

223   replicated mental disorders to be a major contributor to disability [6]. In line with this, our

224   results showed a widely used measure of disability, namely the number of years lived with

225   disability (YLD), to range from 1617.8 (Hungary) to 2603.9 (Portugal), hence unacceptably

226   high across Europe, which will require coordinated delivery of effective prevention and

227   treatment programs by governments and the global health community.

228   More importantly, mortality, particularly suicide, can be considered as the most tragic

229   outcome in MH. In this respect, mortality rates per 100,000 inhabitants in 2021 ranged from

230   8.9 (Slovakia) to 84.0 (UK), i.e., an almost 10-fold variation, which may have been due to

231   reporting differences, especially for deaths by natural causes, which cannot be easily linked

232   with MH issues by the relevant authority across countries. This is less likely to apply to

233   suicide rates (per 100,000 inhabitants) which in 2020 ranged from 3.45 (Cyprus) to 21.25

234   (Lithuania), hence a 6-fold variation. Both mortality and suicide rates have remained

235   unchanged in Europe for the past few years, as supported by the Global Burden of Disease

236   2019 study [25]. Addressing the mortality gap in MH, particularly in schizophrenia [9], through

237   psychosocial interventions targeting modifiable risk factors, such as unhealthy lifestyles [26],

238   urges multi-agency action worldwide [27,28].

239   **Determinants of mental health of the European population**

240   The well-established individual, environmental and social determinants of MH have

241   been demonstrated to be unequally distributed within- and between populations [4,29], which

242   is in full agreement with our data showing high variation across the board. This raises a

243   fundamental question: to what extent is one's MH (pre)determined by external

244   socioeconomic and environmental factors? Truly, up to 62% of Europeans, especially women

245   (67%), were affected by the aforementioned post-pandemic polycrisis [13]. In keeping with

246   this, the 2023 Headway Mental Health Index 3.0 incorporated some relatively novel

9

247   polycrisis-related KPIs, such as the impact of natural disasters, eco-anxiety and crime level

248   on MH [16].

249   The effects of *natural disasters* on MH are well-established [30]. In Europe the

250   number of natural disasters has grown from 91 in 1979 to 1,452 in 2019, accounting for over

251   145,000 deaths over the past 40 years [16]. Although exposure to these events has been

252   linked with negative MH outcomes [30], adequate MH support, community resilience

253   initiatives and disaster preparedness measures [31], including use of mobile apps [32], may

254   mitigate this.

255   *Eco-anxiety*, which can be defined as a "pre-traumatic stress disorder in response to

256   climate change and ecological crises", has become a focus of major concern in global public

257   MH [33], including Europe [34]. Eco-anxiety appears to particularly affect children and

258   adolescents' MH [35] irrespective of neuroticism and/or personal beliefs [36]. Combating

259   climate change may therefore contribute to preventing mental disorders via reduced risk of

260   eco-anxiety, especially for youth, a universal prevention measure to which the European

261   Psychiatric Association (EPA) is particularly committed [34].

262   *Crime level* has been long associated with poorer MH and identified as a barrier to

263   engagement in health-promoting activities [37]. Truly, community violence was linked with

264   poorer MH outcomes [38]. While victims of crime may benefit from targeted prevention

265   interventions, future studies should clarify the extent to which crime level affects MH, whilst

266   controlling for social disadvantage and related factors.

267   **Relationship between mental health status and its determinants across Europe**

268   As noted above (Table 4), the extent to which determinants of MH predicted the

269   population MH status across countries was found to be somehow weak. In particular, there

270   were both 'high risk, good MH' countries, such as Bulgaria, Croatia, Romania, Greece, Italy

271   and Latvia; and 'low risk, poor MH' countries, namely Ireland, Lithuania, The Netherlands,

272   Sweden and Hungary. Although further non-tested risk/protective factors may contribute to

273   MH and quality of data and reporting issues should be considered, this is likely to be

10

274 explained, in large part, by countries' responsiveness to their citizens' MH needs (see

275 Arango et al., this issue).

276   Based on the bivariate associations between KPIs scores (Table 5), alcohol use,

277 smoking, hours of daylight, commuting time, ecoanxiety, air pollution and Fragile State Index

278 emerged as the *common* determinants of MH across Europe. *Smoking and alcohol use* have

279 been consistently linked to poorer (mental) health outcomes worldwide [39] in spite of

280 significant progress in fighting both addictions [40]. Daylight exposure was linked with better

281 MH [41], consistent with our data showing a positive relationship between more hours of

282 daylight and lower suicide rates [42]. Interestingly, ecoanxiety can be both cause and

283 consequence of mental disorders [33]. Commuting time, which can be defined as the

284 proportion of people who take over 30 minutes to go to work, showed a positive correlation

285 with MH status – the lower the proportion of people with long commuting times, the better the

286 MH. Reducing commuting time may therefore prevent mental disorders, such as depression

287 in adults [43] and in adolescents [44], which warrants future intervention studies. The Fragile

288 State Index can be considered as a proxy measure of social cohesion, economic status and

289 political stability of countries, which is inextrincably linked to most determinants of MH [29],

290 thus behaving as a major MH risk factor, especially for child maltreatment [45]. Poverty

291 alleviation programs, which have been recommended by the Lancet-Commission [46], may

292 reduce this risk [47].

293   Also, sexual abuse, noise pollution and proportion of green area correlated with most

294 status KPIs except mortality and suicide (Table 5). Between 11% (men) and 13% (women) of

295 MH service users were meta-analytically found to have suffered from sexual abuse, a well-

296 established predictor of poor MH outcomes [48–50]. Although noise pollution was thought to

297 worsen MH, high-quality longitudinal studies showing the benefits from noise-reducing

298 policies are lacking [51]. Finally, our findings revealed that countries with a higher proportion

299 of green area space achieved better MH status, except for suicide outcomes, which was

300 probably due to the link between rurality and increased suicide risk, hence, a complex issue

301 worthy of further investigation [52].

302 **Next steps**

303   This first Headway data-based study provided an overview of the population MH

304 status and its determinants across Europe, which may pave the way towards more targeted

305 prevention interventions. In short, this study may provide new insights into the extent to

306 which one's MH status is determined by such a complex interplay of individual,

307 environmental and social factors, which is not to underestimate the role of genetics and other

308 neurobiological variables in the aetiology and outcomes of mental disorders [21].

309   Interestingly, a well-studied indicated prevention intervention in psychiatry, such as

310 the 'At clinical high-risk for psychosis' (CHR-P) model [53], has largely failed to predict [54]

311 and prevent [55] transition to psychosis. Even in a catchment area with well-resourced CHR-

312 P clinics, such as South-East London (UK), only 4.1% of first-episode psychosis incident

313 cases had presented to these CHR-P clinics and met CHR-P criteria [56]; hence, of little

314 value from a public health and/or economic perspective [57]. Alternatively, from a universal

315 prevention approach, decreasing population exposure to well-known risk factors for

316 psychosis, such as cannabis use [58], may be more effective [59]. Consistent with this public

317 health model, some evidence-based prevention measures in MH can be recommended [17],

318 which were also demonstrated to be cost-effective, especially in children and adolescents

319 [60,61]. Of note, most major mental disorders onset occurs before age 25 [62], thus making

320 childhood and adolescence the optimal period to deliver any preventive intervention [19]. In

321 line with this notion, Table 6 provides some examples of primary prevention strategies

322 targeting the common determinants of MH across Europe.

323   **Insert Table 6 here**

324   Prevention in MH has attempted to reduce exposure to well-established *risk* factors

325 thus far. However, in the years to come the focus should be switched towards promoting

326 *protective* factors [19], such as resilience [63], physical activity [64], school-based social and

327 emotional learning [65]. Of note, this MH promotion model has proved useful in asylum

328 seekers children and adolescents [66], which are in line with global strategies promoting

329 physical health in psychiatry [20] and the 2023 European Commission (EC) Mental Health

330   Strategy [67]. More controversially, the long-term benefits from new technologies, such as

331   smartphone-based apps, remain less clear and their recommendation, particularly to the

332   youth, raises ethical issues [68].

333   Advancing in preventive psychiatry, however, seems to be hampered by stigma [69],

334   which underestimates the general public perception of the need for MH prevention, and

335   financial issues. In particular, its *long-term* high return appears to discourage health

336   authorities and policymakers from investment in MH prevention as a priority [17].

337   **Strengths and limitations**

338   Data supporting this study findings came from the updated 2023 Headway Mental

339   Health Index 3.0, which measured 54 MH-related KPIs across EU-27 countries and the UK,

340   thus allowing direct country-to-country comparisons. All data sources were official

341   authoritative open-access datasets. Results may therefore inform some evidence-based

342   public MH strategies and universal primary prevention interventions.

343   However, this study has three limitations. First, the Headway methodology relied

344   partly on national datasets which differed in quality of data, which also were collected during

345   different years. Specifically, mis- and under-reporting issues should be considered. Second,

346   non-tested KPIs, such as mass media use or fear of war, may influence on the European

347   population MH. Third, both analytical and qualitative approaches were adopted, which may

348   have incorporated some biases, although this seems unlikely.

349   **Final remarks**

350   The post-pandemic polycrisis [16] has put MH at the top of the political agenda of

351   numerous institutions and governments, including the European Commission [67]. This is

352   therefore a unique opportunity to implement a new roadmap for MH in Europe [16] under the

353   scientific leadership of the EPA, although the challenges ahead will require increased efforts.

354   In particular, while precision psychiatry cannot yet inform clinical decision-making at an

355   individual level [70], *universal preventive psychiatry* seems to be much more within our grasp

356   [71].

357

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358 **DATA AVAILABILITY STATEMENT:**

359 All the data supporting the findings of this study are available in the online

360 supplementary material.

361 **ACKNOWLEDGEMENTS:**

369 **AUTHOR CONTRIBUTIONS:**

370 Conceptualization: JDLM, AF, GD, CA. Data curation: JDLM. Formal analysis: JDLM.

371 Methodology: JDLM, AF, GD, CA. Project administration: JDLM, CA. Supervision: AF, GD,

372 CA. Validation: JDLM, AF, GD, CA. Visualization: JDLM, AF, GD, CA. Writing-original draft:

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382

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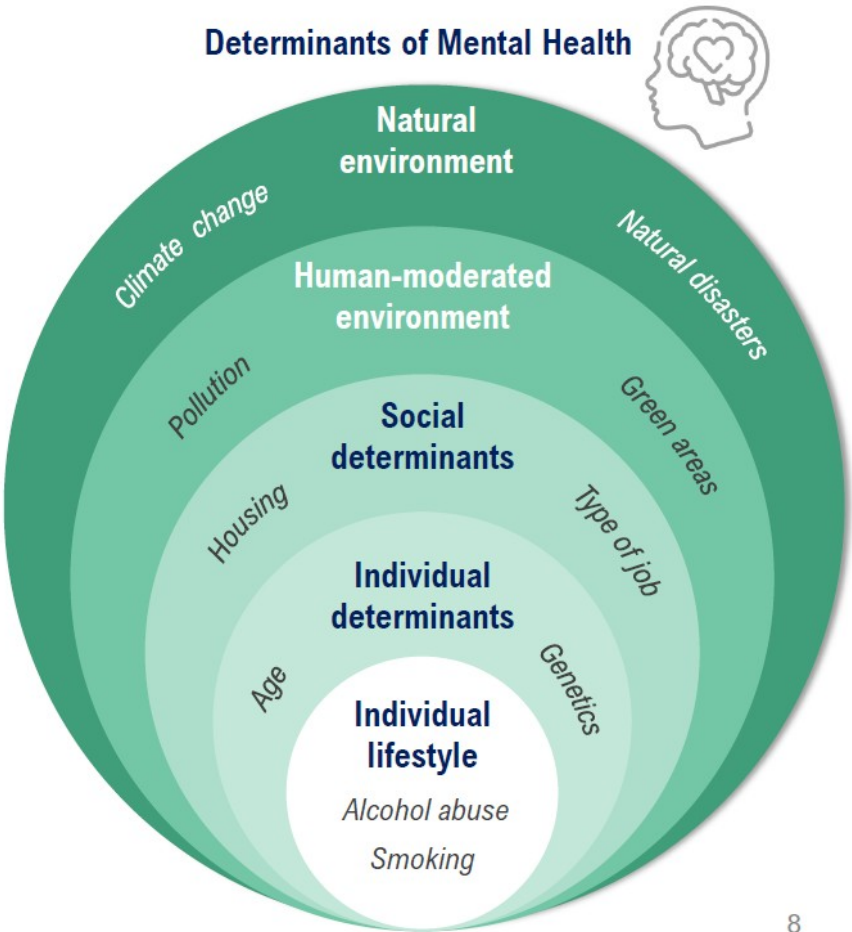
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605　　Figure 1

Determinants of Mental Health

Natural environment

Climate change

Natural disasters

Human-moderated environment

Pollution

Green areas

Social determinants

Housing

Type of job

Individual determinants

Age

Genetics

Individual lifestyle

Alcohol abuse

Smoking

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Table 1. Mental health status across Europe: The Headway Initiative methodology

KPI	Variable(s)	Measure	Data Source
Prevalence	Prevalence of depression	Rate per 100,000 inhabitants	Global Burden of Disease, 2019
	Prevalence of anxiety		
	Prevalence of schizophrenia		
	Prevalence of bipolar disorder		
	Prevalence of ADHD*		
	Prevalence of CD*		
	Prevalence of LD*		
Incidence	Incidence of depression	Rate per 100,000 inhabitants	Global Burden of Disease, 2019
	Incidence of anxiety		
	Incidence of schizophrenia		
	Incidence of bipolar disorder		
	Incidence of ADHD*		
	Incidence of CD*		
	Incidence of LD*		
YLDs	YLDs for the general population	Rate per 100,000 inhabitants	Global Burden of Disease, 2019
	YLDs for under-20		
Mortality	MH-related mortality rates in under-20 in 202	Standardised rate per 100,000 inhabitants	Eurostat, 2021
Suicide	Suicide rates in 2020	Standardised rate per 100,000 inhabitants	Eurostat, 2020

609 KPI: Key Performance Indicator. YLDs: Years Lived with Disability. * Only for under-20 people.
610 URLs:
611 Global Burden of Disease, 2019:
612 https://vizhub.healthdata.org/gbd-compare/
613 Eurostat, 2021:
614 https://ec.europa.eu/eurostat/databrowser/view/hlth_cd_aro__custom_11584303/default/table?lang=en
615 Eurostat, 2020:
616 https://ec.europa.eu/eurostat/databrowser/view/HLTH_CD_ASDR2__custom_11584510/default/table?lang=en

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Table 2. Determinants of mental health in Europe: the Headway Initiative methodology

KPI	Variable	Measure	Data Source
Individual factors			
Smoking	Daily smoking	% population	OECD. Health at a Glance, 2022.
Alcohol abuse	Heavy episodic drinking in the last month	% population	OECD. Health at a Glance, 2022.
Drugs abuse	Use of illicit drugs in the last year	% population	European Drug Report 2022
Bullying	Weekly bullying	% school population	PISA, 2018
Sexual Abuse	YLD rate per 100,000 population	% school population	Global Burden of Disease, 2021
Environmental factors			
Hours of daylight	Annual hours of daylight in European capitals	Number of hours	National databases, 2020
Temperature increase	Average Temperature increase: 2022 vs. 1951-1980		IMF, 2022
Extreme weather impact	Loss per capita due to extreme weather 1980-2021	Euros per capita	European Environment Agency, 2022
Natural disasters	Risk of natural disasters	%	EHS, 2022
Ecoanxiety	Exposure climate change-related threats	% population	Eurobarometer, 2023
Air pollution	Exposure to PM2,5 in urban areas	% population	EEA, 2022
Noise pollution	Feel impacted by noise, 2020	% population	Eurostat, 2021
Transport and road traffic	Hours per year	Traffic index	TomTom, 2019
Urban Green Space	Green infrastructure over total area	%	European Environment Agency, 2021
Commuting time	People taking over 30 minutes to work, 2019	% population	Eurostat, 2019
Socio-economic factors			

Fragile State Index	Score	Score	Fund for peace, 2023
Poor Housing	People living in poor housing conditions	% population	Eurostat, 2021
Overcrowding rate	People living in overcrowded houses	% population	Eurostat, 2022
Crime level	Weighted average of crime indicators	Crime Index	Eurostat, 2020

618 URLs:
619 OECD. Health at Glance, 2022: https://www.oecd-ilibrary.org/social-issues-migration-health/daily-smoking-rates-among-adults-by-gender-2020-or-nearest-year_aade1255-en
620 European Drug Report 2022: https://www.euda.europa.eu/publications/edr/trends-developments/2022_en
621 PISA, 2018: https://www.oecd-ilibrary.org/education/pisa-2018-results-volume-iii_acd78851-en
622 Global Burden of Disease, 2021: https://vizhub.healthdata.org/gbd-compare/
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632 Eurostat, 2021: https://ec.europa.eu/eurostat/databrowser/view/tessi292/default/table?lang=en&category=t_ilc.t_ilc_md.t_ilc_mdho
633 Eurostat, 2022: https:// ec.europa.eu/eurostat/databrowser/view/tessi170/default/table?lang=en&category=t_ilc.t_ilc_lv.t_ilc_lvho.t_ilc_lvho_or
634 Eurostat, 2020: https:// ec.europa.eu/eurostat/databrowser/view/crim_off_cat/default/table?lang=en&category=crim.crim_off
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Table 3. Mental health status across European countries: Headway-transformed KPI scores

	Prevalence	Incidence	YLDs general	YLDs < 20	Mortality	Suicide	TOTAL SCORE
Austria	6,7	5,5	6,1	5,1	6,3	5,8	5,1
Belgium	7,6	4,8	8,2	9,9	5,4	4,0	4,1
Bulgaria	8,7	10,0	4,0	2,8	5,9	7,7	6,3
Croatia	7,4	9,1	9,8	10,0	7,1	5,1	5,8
Cyprus	7,2	4,1	7,5	9,5	6,8	10,0	7,8
Czechia	9,0	9,1	2,2	1,0	8,8	5,9	5,8
Denmark	8,0	6,1	6,4	6,2	4,0	6,7	4,5
Estonia	7,8	7,8	8,9	9,7	9,4	3,5	5,7
Finland	5,1	5,7	5,7	5,4	4,4	5,2	4,1
France	5,6	3,7	4,4	4,7	6,6	4,9	4,2
Germany	7,5	7,1	5,3	5,5	2,4	6,5	4,7
Greece	2,6	5,1	2,3	3,9	8,0	9,7	7,1
Hungary	8,1	9,3	10,0	9,8	5,8	3,1	4,3
Ireland	1,7	1,0	3,4	4,2	6,8	6,9	3,2
Italy	3,0	6,1	4,8	5,2	5,6	8,9	6,4
Latvia	8,0	8,0	8,7	9,6	6,0	3,9	6,0
Lithuania	6,5	7,8	7,8	9,1	9,2	1,0	3,8
Luxembourg	4,2	4,7	5,8	5,8	5,5	6,7	4,6
Malta	6,0	5,9	5,4	5,3	3,5	9,7	6,4
Netherlands	2,5	3,7	4,0	4,6	3,0	6,4	2,1
Poland	7,6	8,8	8,2	8,6	5,9	5,7	5,6
Portugal	1,0	5,1	1,0	2,4	3,6	7,5	4,3
Romania	7,8	8,6	6,9	7,7	5,9	7,2	6,3
Slovakia	10,0	8,7	7,0	8,2	10,0	8,3	8,3
Slovenia	9,0	9,1	9,7	10,0	8,6	3,1	5,7
Spain	1,1	4,2	2,6	3,4	5,9	7,8	4,5
Sweden	3,5	3,5	5,2	5,8	3,5	5,7	3,1
United Kingdom	5,2	3,1	5,5	6,0	1,0	6,4	2,6

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Table 4. Individual, environmental and socioeconomic determinants of mental health across European countries: Headway Initiative index scores

	Individual	Environmental	Socioeconomic	DETERMINANTS	STATUS
Austria	3,2	6,0	7,2	5,5	5,1
Belgium	5,3	4,5	6,5	5,4	4,1
Bulgaria	2,4	5,9	3,2	3,9	6,3
Croatia	3,7	5,2	2,3	3,7	5,8
Cyprus	9,2	9,6	2,6	7,1	7,8
Czechia	4,3	5,3	5,7	5,1	5,8
Denmark	1,8	5,9	7,4	5,0	4,5
Estonia	6,9	10,0	5,8	7,5	5,7
Finland	6,4	9,6	8,1	8,0	4,1
France	3,1	2,4	3,9	3,1	4,2
Germany	1,0	4,9	7,6	4,5	4,7
Greece	6,8	1,0	2,0	3,3	7,1
Hungary	5,5	4,1	3,6	4,4	4,3
Ireland	5,3	6,1	8,3	6,6	3,2
Italy	4,5	3,7	3,6	3,9	6,4
Latvia	4,8	5,8	1,0	3,9	6,0
Lithuania	5,5	8,1	4,0	5,9	3,8
Luxembourg	4,8	4,9	7,5	5,7	4,6
Malta	7,7	5,3	8,7	7,2	6,4
Netherlands	3,5	6,2	10,0	6,6	2,1
Poland	7,2	5,0	2,9	5,1	5,6
Portugal	6,5	5,0	6,0	5,8	4,3
Romania	2,6	2,3	3,5	2,8	6,3
Slovakia	5,2	6,2	3,3	4,9	8,3
Slovenia	6,4	5,9	5,9	6,1	5,7
Spain	5,1	4,3	3,8	4,4	4,5
Sweden	10,0	7,5	5,1	7,5	3,1
United Kingdom	3,9	4,2	2,5	3,5	2,6

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Table 5. Relationship between determinants and status KPIs scores across European countries

	Prevalence		Incidence		YLD_AD		YLD_CHILD		Mortality		Suicide		STATUS	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Individual factors	-0.21	.285	-0.19	.327	-0.05	.779	0.22	.260	0.17	.397	0.08	.700	0.21	.292
Smoking	-0.29	.127	**-0.38**	**.045**	-0.15	.450	-0.08	.689	-0.39	.039	-0.15	.450	**-0.43**	**.021**
Alcohol abuse	-0.17	.382	0.09	.660	-0.19	.325	-0.01	.961	0.37	.049	0.27	.165	**0.57**	**.002**
Drugs abuse	0.27	.170	**0.42**	**.024**	.121	.539	0.24	.224	0.01	.622	0.05	.789	0.29	.128
Bullying	**-0.38**	**.046**	**-0.37**	**.050**	-0.21	.271	-0.10	.65	-0.15	.439	-0.14	.148	-0.27	.156
Sexual Abuse	**0.67**	**<.001**	**0.51**	**.006**	**0.72**	**<.001**	**0.74**	**<.001**	**0.55**	**.003**	**-0.42**	**.026**	-0.10	.596
Environmental factors	0.18	.352	.01	.944	0.28	.156	0.272	.161	0.14	.463	-0.25	.193	-0.20	.323
Hours of daylight	0.24	.218	-0.04	.853	-0.34	.081	0.13	.504	0.01	.960	**0.66**	**<.001**	**0.73**	**<.001**
Temperature increase	0.04	.835	.011	.955	0.03	.858	0.16	.410	0.05	.783	0.28	.156	0.22	.251
Weather events	0.16	.409	0.17	.393	0.23	.237	0.33	.086	0.10	.595	-0.03	.880	-0.01	.991
Natural disasters	**0.58**	**.001**	0.33	.089	**0.51**	**.005**	0.26	.183	0.14	.485	-0.32	.098	-0.30	.134
Ecoanxiety	0.01	.615	-0.15	.448	0.14	.466	-0.01	.953	0.10	.595	-0.48	.010	**-0.51**	**.005**
Air pollution	**-0.37**	**.050**	**-0.59**	**.001**	-0.20	.315	-0.14	.450	-0.34	.073	-0.27	.161	**-0.46**	**.015**
Noise pollution	**0.51**	**.006**	**0.48**	**.010**	**.55**	**.003**	**0.46**	**.015**	**0.59**	**.001**	**-0.38**	**.049**	-0.06	.757
Transport and traffic	0.24	.213	0.23	.234	0.24	.231	0.03	.874	0.12	.53	-0.22	.257	-0.14	.467
Urban green space	**0.40**	**.034**	**0.46**	**.014**	**0.54**	**.003**	**0.46**	**.015**	0.36	.061	**-0.61**	**.001**	-0.27	.162
Commuting time	-026	.174	-0.11	.578	-0.35	.065	-0.09	.638	0.28	.153	0.26	.189	**0.42**	**.026**
Socio-economic factors	-0.23	.238	-0.35	.067	-0.14	.470	-0.31	.111	-0.32	.098	-0.01	.969	-0.31	0.110
Fragile State Index	-0.28	.154	**-0.44**	**.018**	-0.13	.508	-0.25	.200	**-0.40**	**.035**	-0.19	.333	**-0.44**	**.018**
Poor Housing	0.22	.261	0.31	.110	0.16	.426	-0.13	.51	0.06	.749	-0.11	.560	-0.08	.689
Overcrowding rate	**-0.39**	**.039**	-0.68	<.001	-0.28	.148	-0.25	.199	**-0.39**	**.042**	0.10	.613	-0.25	.193
Crime level	0.25	.199	0.55	.002	0.15	.446	0.15	.434	**0.56**	**.002**	0.08	.679	0.39	.038
DETERMINANTS	-0.13	.492	-0.27	.167	0.03	.892	0.07	.738	-0.02	.924	-0.09	.647	-0.16	.419

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Table 6. Proposed prevention strategies targeting the determinants of mental health in Europe

Determinants	Intervention	Type of prevention	Level of evidence
Individual factors			
Smoking, alcohol and drugs	School-based SEL	Universal Primary	MA (Taylor et al., 2017)
	Digital Mental Health	Universal Primary	MA (Wies et al., 2021)
	School-based programmes	Universal Primary	MA (Onrust et al., 2016)
Bullying	School-based Interventions	Universal Primary	MA (Fraguas et al., 2021)
Sexual abuse	School-based Intervention	Selected Primary	MA (Che Yusof et al., 2022)
Environmental factors			
Natural disasters	Mobile apps	Universal Primary	MA (Ezeonu et al., 2024)
Ecoanxiety	Planetary health education	Universal Primary	Future research needed
Air pollution	Nature-based Interventions	Universal Primary	Future research needed
Noise pollution	Nature-based Interventions	Universal Primary	Future research needed
Green space	Nature-based Interventions	Universal Primary	Future research needed
Commuting time	Nature-based Interventions	Universal Primary	Future research needed
Socioeconomic factors			
Fragile State Index	Poverty alleviation programmes	Universal Primary	MA (Zaneva et al., 2022)

646 SEL: Social and emotional Learning. MA: Meta-analysis.
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