

Mental health of young talented football players in an African context: A cross-sectional observational study

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ABSTRACT

Background: Elite sport is a potentially pathogenic environment due to stressors like dual-career, high training demands, and performance pressure. Recent evidence suggests that athletes are at high risk of mental health issues. Even though the FIFA is increasingly paying attention, efforts directed towards young talented footballers are scarce. Few studies have even been conducted on young talented footballers in Africa. The majority of epidemiological studies on athletes also suffer from an analytical approach that does not highlight athletes' mental health profiles. This study aims to describe the mental health profile and their prevalence of young talented footballers in three African representative countries.

Methods: The study applied an observational-based cross-sectional research design with aspiring footballers from three sub-regions of Africa and aged between 10 and 23. The data was collected face-to-face from March to November 2022. Three screening tools were used to measure three mental health outcomes: Satisfaction With Life Scale (subjective well-being), Patient Health Questionnaire 9-item (depression), and Generalized Anxiety Disorder 7-item scale (anxiety). The mental health outcomes were rates and scores of well-being, depression, and anxiety, used in latent profile analysis.

Findings: 507 male young talented footballers (263[51.9%] Cameroonians, 73[14.4%] Moroccans, and 171 [33.7%] Ivorians) were included in the analysis with a mean age of 15.1 (SD 2.37) years. Screening of mental health states revealed that 367(72.3%) and 412(81.8%) of these players experienced anxiety and depressive symptoms respectively and 155(30.7%) experienced low well-being. Differences in mental health outcomes were noted between countries, age groups and competition levels. Three profiles of mental health condition were also identified, namely moderate mental health (Profile 1), languishing (Profile 2) and flourishing (Profile 3).

Interpretation: The youth of football academies in the three African countries studied have a specific mental health profile, revealing a high prevalence of common mental disorders in the African context. These findings underline the need to enhance the awareness of mental health issues in young African players and provide tailored support.

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1. Introduction

The current context of youth talented sports is characterized by several factors (pressure to become a professional, early specialization, a demanding lifestyle, injuries, etc.) leading to mental health problems [1,2,38]. As stated by the World Health Organization (WHO), young people (compared to older adults) are at higher risk have of poor mental health [10]. In addition, elite sports is a potential additional factor of vulnerability [4,38,39]. Recently, the procedures and techniques of football academies have raised questions about wellbeing, as footballers

tend to experience mental health issues more than the general population [2,4,5]. Younger talented athletes are the most vulnerable and affected [6,7]. The prevalence of common mental disorders (depression and anxiety) in elite young athlete is estimated between 15% and 40% [38,39]. In Africa, epidemiological data on the common mental disorders are limited [40,41]. Available data show that, the average prevalence of depression and anxiety in adolescents from sub-Saharan Africa is 29.8% and 26.9% respectively [41]. In a North Africa countries like Morocco, the prevalence in general population is estimated around 37% and 26.5% respectively for anxiety and depression [42]. A prevalence of

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16.3% of distress and 4.2% of common mental disorders was found in professional South African rugby players [36]. For professional South African cricketers the prevalence of common mental disorders was 59% [43]. In the same country, 12% and 76% of para athletes had respectively clinical and subclinical symptoms of anxiety and/or depressive disorders [44]. Unfortunately, no study provides prevalence data on the mental health problems in African young athletes (Fig. 1).

Mental illness can have serious consequences, ranging from hospital admissions to suicide attempts, parasuicides, and suicides, among former, current and aspiring football players [8,9,65]. The International Olympic Committee (IOC), the Fédération Internationale de Football Association (FIFA), and some national organizations are stepping up initiatives to protect players' mental health. Unfortunately, these responses remain insufficient and/or ill-adapted [10,11]. The inadequacy of some of these responses – especially those oriented towards Africa – may be due to limited knowledge of the issue. Indeed, few studies have yet been conducted on the mental health of young footballers in Africa [37]. Moreover, while there is a reservoir of talented football players, Africans rank among the world's least happy people [12].

In Low- and Middle-Income Countries (LMIC), mental health issues are severely neglected, and mental health systems are more deficient than elsewhere [10]. This context can be explain by structural and individual factors. At the structural level, mental health systems are characterized by imbalances in information, governance and resources [10,45]. Mental health care is under supported financially and many people with an identified mental health condition is left without treatment [10,45]. At the individual level, low levels of mental health literacy, stigma, beliefs and discrimination hinder people to behave appropriately [10,27,46]. Mental health literacy refers to the knowledge and skills that enable individuals to preserve mental health as well as

recognize the signals of a mental health problem and adopt appropriate behavior accordingly [63]. Thus, low levels of literacy can lead to misinterpret mental illness as a religious issues and trigger a faith healers consultancy [27,46]. The stigma and beliefs that prevent athletes from seeking help are ingrained in some African cultures [13]. Stigma weighs heavily in the ways that individuals care for their mental health, perceive mental illness and seek help [27]. Some stigmas convey the belief that mental illness is linked to supernatural powers [13,27]. As mental health is the fundamental resource for any culture of development and performance, there is an urgent need to break stigma surrounding mental health. Addressing the mental health of young talented African footballers could be a starting point by showing that mental health issues are real, and by simultaneously providing decision-makers with information for a situated intervention.

It is important to remember that mental health is not simply the absence of mental illness or the presence of high levels of well-being. The flourishing-languishing model describes mental health on two continuums (absence/presence of mental health; absence/presence of mental illness), which provide a complete picture of mental health state [14]. Accordingly, athletes can have positive mental health and also simultaneously experience mental illness, or be free from mental illness but still be languishing [15]. Therefore, it is more useful to identify the profile of an athlete using both the mental health and illness continuums. As few studies have yet explored the mental health of young talented footballers in Africa [37], Keyes's model has not yet been tested, even though it has been shown useful for a holistic understanding of mental health in sport [15,16]. In keeping with the above, the present study set out to examine this issue: what is the mental health condition of young talented footballers in diverse African countries? The study targeted the following two objectives: (a) to assess and compare the

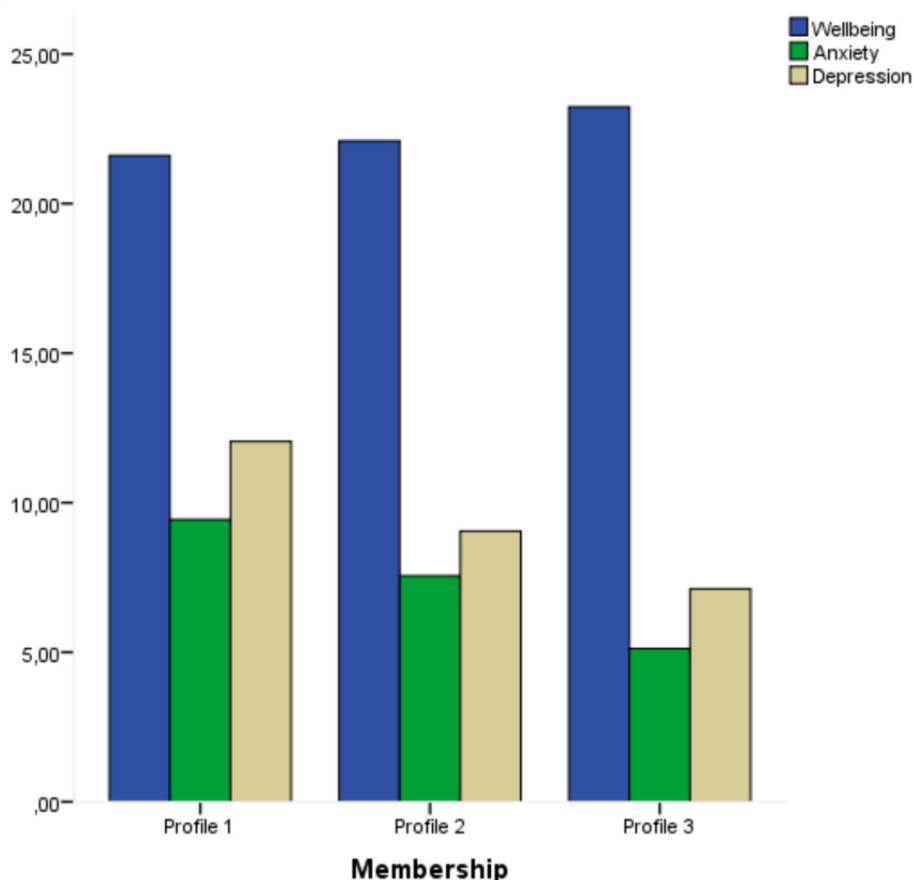


Fig. 1. Mental Health Scores by profiles.

prevalence of mental health problems among young talented football players in three African countries, and (b) to identify their mental health profiles. This study followed the criteria for a suitable study population in African context [17]: one type of sport (football), a popular sport (football is Africa's most popular sport), and a high level of play (talented).

Research in context

Evidence before this study

We searched PsycInfo, PubMed, APA PsycNet, Google Scholar and Google databases from March 2022 to June 10, 2024, with the terms “mental health”, “depression”, “anxiety”, “distress”, “wellbeing”, “happiness”, and “common mental disorders” combined with “sport”, or “athlete”, or “elite sport”, or “organized sport”, and “student-athlete”, both in English and French, to identify articles and reviews published in these languages on athletes' mental health. We also checked for relevant publications in the reference lists of selected articles.

The evidence suggests that today's youth (“iGen generation”) are more vulnerable to mental health issues, and the context of elite sport increases this vulnerability to the point where young talented athletes are more distressed than the general population. The iGen model argues that technological advances have led to a new generation of youth (iGen Generation) whose behavioral patterns are characterized mainly by overconsumption of the Internet and vulnerable mental health condition [3]. Even though this hypothesis sounds interesting, few empirical studies have tested it suggesting that empirical data to consistently supports this model remain limited [47]. The epidemiological research on athletes' mental health undertaken so far focuses mostly on Western countries and highlights the increasing prevalence of mental health problems. Most of studies were conducted in Western countries and few in Southern Africa [19,39,48]. Young males experience the most mental health problems and male or non-white race athletes have higher risk of suicide [48,49], while Most of studies focus on female population and cross-sectional designs [39]. The prevalence of anxiety/depression in professional athletes is around 34% and that on young athletes is ranged from 15% to 40% [19,39]. However, Elite athletes have lower risk of suicide [48]. The flourishing-languishing model is suggested as a relevant framework for studying mental health condition of athletes [15,16,39]. The few studies in southern Africa suggest that: prevalence of mental health problems in athletes is low, but they perceived their life as stressful; athlete support services are poor, and there is a significant relationship between anxiety and injury occurrences or doping in talented young athletes. [30,36,37,39] Overall, the majority of athlete's mental health studies have heterogeneous samples, varied screening tools, and conceptualize the presence of a state of well-being as opposed to the presence of symptoms of mental disorders [17,19,39,48].

Added value of this study

The study findings show that mental health problems are rife among Africa's young talented footballers, and indicate that the youngest players and those playing in lower-level competitions are the most at risk. This study focused in depth on mental health in Africa with a homogeneous sample based on the vulnerable population of youth in football academies. It also used screening tools suggested by the IOC to facilitate harmonization of data on mental health in sport. The results suggest the prevalence of mental disorders among young talented footballers in three African countries is very high compared to those reported in previous studies from Western countries. This study is the first to provide prevalence data on the mental health condition of elite talented young athletes in African context. Thus, it highlights contextual data on mental health of African young athletes.

Implications of all the available evidence

This study's detailed profiles of mental health condition and prevalence data, together with the findings of previous studies, provide information on the specificity of each environment and context of each sport. FIFA and other organizations are increasingly interested in players' mental health, but their interventions are often criticized as inadequate. This data will allow mental health policy-makers to take actions that better meet the situated needs of athletes such as suited mental health literacy programs and interventions targeting depression and anxiety. For coaches and educators, it is crucial to be aware of difference in mental health condition of young players according to their competition level and age group.

2. Method

2.1. Study design

This observational study applied a cross-sectional research design. Cross-sectional designs are suited for prevalence studies [18]. They are generally used for studies of football players; they assess the prevalence of diseases, generate associations between study variables, and compare groups [6,16,17]. Thus, this design is suited for the objectives of this study.

2.2. Participants

Based on an average prevalence of 20% from previous studies [2], and a 99% confidence level with an absolute precision of 3%, a sample size of 425 participants was required to reach statistical relevance [28]. This study recruited aspiring footballers from three different sites: Cameroon (Central Africa), Morocco (North Africa) and Côte d'Ivoire (Western Africa). These countries are representative of three current sub-cultures of soccer academies in French-speaking Africa. In the three sub-regions, the selected countries are those whose governments invest the most in sport [29]. The study does not include countries from East and Southern Africa because many of these countries are English-speaking, and there are already some studies on the mental health of English-speaking African footballers [30]. This does not mean that there is no need for studies on the mental health of young elite footballers from these Anglophone sub-regions. Given limited resources, this project focused on French-speaking African countries.

2.2.1. Socio-cultural background of participants

Morocco, Côte d'Ivoire and Cameroon are classified among the LMIC, even if the gross domestic product per capita is higher in Morocco followed by Côte d'Ivoire and Cameroon respectively. During the 15 last years, population of these countries experienced violent socio-political crises leading to deaths and internal displacement. In LMIC, <2% of health care budget is oriented towards mental health provisions [10]. Mental health policies in Morocco, Côte d'Ivoire and Cameroon face a lot of challenges such as lack of resources, lack of legal framework, shortage of professional, and the management of mental health issues mainly by non-conventional mental health care facilities [46,50,51]. Even though Morocco achieved more improvements over the time, the cultural beliefs (fatalism, stigma, etc.) in the population of this three countries represents another burden to effectively handle mental health issues [10,13,27].

2.2.2. Participant recruitment

Football academies were recruited in collaboration with the Fédération Internationale des associations de Footballeurs Professionnels of Africa (FIFPro-Africa) which is the representative organization for African professional footballers. Many academies were contacted in each of the three countries, by presenting the objectives and process of the study. Academies which accepted to participate defined with researchers a collaboration planning. In Cameroon, four academies were recruited and data collection took place between April 1 and May 15, 2022. Then, in Morocco, this process took place between September 18 and October 10, 2022, with three academies. Finally, in Côte d'Ivoire, three academies took part in data collection between October 11 and November 10, 2022. In Morocco, the size of the participating academies was small and the majority of those contacted were reluctant to participate in the study. The study was conducted face-to-face and in French at all three sites under the supervision of the first author who has a work experience with football academies in Cameroon.

To be eligible for the study, potential participants had to be: (i) in a football academy, (ii) engaged in an elite football program in the academy, (iii) provided assent, (iiii) and aged at most of 23 years, which, according to FIFA, corresponds to a player's highest training age. Furthermore, mental health problems are the seventh-highest contributor the burden of disability-adjusted life years for youth aged under 25 in LMIC [46]. Before proceeding to data collection, the researcher explained carefully to the participants the purpose and process of the study, the confidential and anonymous nature of the study as well as their right to drop out of the study at any time. All participants or their guardians (for minors) also provided written informed consent. After the data analysis, a report with recommendations has been sent to participating academies. The research proposal received approval from the ethics committee of the University of Lausanne, Switzerland (E-SSP-032023-00001).

2.3. Measurements

The mental health outcomes of this study were measured for symptoms of depression and anxiety, and subjective well-being. These mental health constructs are the most prevalent in adolescents and athletes [3,10,17]. Sociodemographic information was collected via a self-report questionnaire and included data on age, age-group, and the level of competition played.

Depression was measured using the Patient Health Questionnaire-9 (PHQ-9), a nine-item self-report questionnaire that records depressive symptoms over the previous two weeks [20]. Depression scores range from 0 to 27. The proposed cut-off points are: 0–4 (no depression), 5–9 (mild depression), 10–14 (moderate depression), 15–21 (mildly severe depression), and 22–27 (severe depression).

Anxiety was measured using the Generalized Anxiety Disorder-7 (GAD-7), a seven-item self-report questionnaire that records anxiety symptoms over the previous two weeks [21]. Anxiety scores range from 0 to 21. The proposed cut-off points are: 0–4 (no anxiety), 5–9 (mild anxiety), 10–14 (moderate anxiety), and 15–21 (severe anxiety).

Subjective well-being was measured using the Satisfaction With Life Scale (SWLS), a five-item self-report questionnaire that assesses the satisfaction feelings an athlete experiences with their life in general and not only in sport [22]. high (positive) well-being was defined as a score of 21 or higher, whilst low (negative) well-being meant a score of 19 or lower, as suggested by the following cut-off points are: 31–35 (extremely satisfied), 26–30 (satisfied), 21–25 (slightly satisfied), 20 (neutral), 15–19 (slightly dissatisfied), 10–14 (dissatisfied), and 5–9 (extremely dissatisfied) [22].

2.4. Choice of primary measure

All outcome measures used in this study were psychometrically validated in French as well as in many other languages [52–54]. PHQ-9, GAD-7, and SWLS were also brief (on average, five minutes of response time), easily accessible (free of charge), and already used for previous studies in Cameroon, Côte d'Ivoire and Morocco without any changes in the factor structures and provided good internal reliability [31–33,55–58]. They are also suitable for a sample of elite athletes, and regularly used in studies on footballers [2]. PHQ-9 and GAD-7 are part of the International Olympic Committee Sport Mental Health Assessment Tool 1 (IOC SMHAT-1), a set of sport-specific screening tools aimed at the early recognition of mental illness implemented by the IOC [23]. These tools obtained good internal consistency in this study: PHQ-9 (Cronbach's $\alpha = 0.71$), GAD-7 (Cronbach's $\alpha = 0.69$) and SWLS (Cronbach's $\alpha = 0.74$).

2.5. Role of the funding source

The funders of the study had no role in the study's design, data collection, data analysis, data interpretation, or writing of the report.

2.6. Data analysis

Data analysis started was undertaken in four stages. First, a descriptive analysis based on rates was made to describe the mental health state of participants in accordance with the cut-offs [20–22]. Then, a multivariate analysis (MANOVA) compared the scores for anxiety, depression and subjective well-being by country, level of competition, and age group. Indeed, MANOVA allows to simultaneously analyze the relationship between multiple outcomes and factors and is less sensitive to unequal sample sizes [59]. Tukey's post-hoc test was combined with the MANOVA when the factor was country or age group. Thirdly, a Latent Profile Analysis (LPA) was undertaken to identify the mental health profiles of talented players. LPA is a statistical technique that allows the detection of subgroups of individuals (profiles) based on a set of numerical variables [60]. The following are fit indices which

have been shown to perform best for deciding the right number of profiles: Bayesian Information Criteria (BIC), Sample-Adjusted Bayesian Information Criteria (SABIC), Akaike Information Criteria (AIC), Consistent Akaike Information Criterion (CAIC), Entropy, Bootstrap Likelihood Ratio Test (BLRT), and latent profile probability [24,25]. A profile solution is best when: BIC, SABIC, AIC and CAIC are lower; entropy and latent profile probability thresholds are close to 1, and BLRT is significant. Profile size is appropriate when it contains >50 participants and 5% of sample [24]. However, the selection of the best solution involves both statistical and substantive considerations as the selected profile solution should provide a theoretical meaning [60]. Finally, a multinomial logistic regression was undertaken to check if the characteristics of young talented players (country, competition level and age) can predict their mental health profile. The country and competition level were nominal variables while age was a numerical (continuous) one. The healthy mental health profile (Profile 3) and the country with a greater number of healthy players (Morocco) were saved as the reference groups. The analyses were conducted with SPSS 24 and Jamovi 2.3.24.

3. Results

Of the 521 male elite football players recruited, 507 had complete data. The response rates were 96.7% for depression (504 fully completed PHQ-9), 97.3% for anxiety (507 fully completed GAD-7) and 96.5% for subjective well-being (503 fully completed SWLS). The average age of the sample was 15.1 (SD = 2.37) years old, and half of the participants were from Cameroon. Most of participants belonged to U15 (28.77%) and U17 (28.17%) age groups and the U23 age group was the less represented (12.30%). The majority of the participants also played competitions at regional level (72.98%). Table 1 shows sample sizes and demographic characteristics for all study participants.

Screening of mental health states in the three countries (Table 2) revealed that 367(72.3%; 95% CI 68.8, 76.5) and 412(81.8%; 95% CI 78.3, 84.7) players experienced anxiety and depressive symptoms respectively. The majority had a degree of severity ranging from mild to moderate. The lowest proportion was recorded for the highest degree of severity: 31 (6.1%; 95% CI 4.2, 8.2) and 12 (2.4%; 95% CI 1.2, 4.0) players for anxiety and depression respectively. Regarding well-being, the majority were satisfied with their lives 310(61.5%; 95% CI 57.3, 65.8) players), and the minority were neutral 38(7.6%; 95% CI 5.2, 9.9) players. The others experienced low well-being. The country-specific data (Table 2) are similar to this general trend, excepting Côte d'Ivoire, where severe depressive symptoms were not detected in any players (Table 2).

A comparison of mental health scores (Table 3) shows a significant difference by country. For anxiety, Côte d'Ivoire scored significantly the highest: $F(2,503) = 5.08, p < 0.01, \eta^2 = 0.020$. However, the highest score of Côte d'Ivoire is significant only compared to the score obtained by Morocco (DM = 1.91, $p < 0.01$). Côte d'Ivoire also scored significantly lower than Cameroon and Morocco on subjective well-being: $F(2,503) = 12.71, p < 0.01, \eta^2 = 0.048$. No significant differences were observed between Cameroon and Morocco. In terms of competition level, a significant difference was observed only for subjective well-being, for which those who played at the regional level obtained the highest scores: $F(1,501) = 9.99, p < 0.01, \eta^2 = 0.020$. There was also significant variation in mental health scores according to age group. Regarding anxiety, the U23 age group had the lowest score: $F(4,495) = 3.16, p < 0.05, \eta^2 = 0.025$. This difference in score is significant when compared to that of the U13 (MD = -1.95, $p < 0.05$) and U15 (MD = -2.17, $p < 0.01$) age groups. There was also a significant difference in subjective well-being $F(4,495) = 5.61, p < 0.01, \eta^2 = 0.043$. The U20 age-group scored the lowest, which is significantly lower than that of the U13 (MD = -4.57, $p < 0.01$), U15 (MD = -3.69, $p < 0.01$) and U17 (MD = -3.35, $p < 0.01$) age groups. No significant difference was recorded for depression scores between countries $F(2,503) = 2.28, p >$

Table 1
Sample characteristics.

Sites	n(%)	Age M(SD)	Age-groups					Competition level	
			U13	U15	U17	U20	U23	regional	national
			n(%)	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Cameroon	263(51•9)	14•7(1•96)	82(78•8)	80(55•2)	69(48•6)	23(45•1)	6(9•7)	216(58•4)	47(34•3)
Morocco	73(14•4)	15•7(3•62)	3(2•9)	18(12•4)	11(7•7)	0(0)	41(66•1)	49(13•2)	24(17•5)
Côte d'Ivoire	171(33•7)	15•2(2•11)	19(18•3)	47(32•4)	62(43•7)	28(54•9)	15(24•2)	105(28•4)	66(48•2)
Total	507(100)	15•1(2•37)	104(100)	145(100)	142(100)	51(100)	62(100)	370(100)	137(100)

Table 2
Rates of mental health conditions of young players by country.

		Cameroon		Côte d'Ivoire		Morocco		Total	
		n(%)	[95% CI]	n(%)	[95% CI]	n(%)	[95% CI]	n(%)	[95% CI]
Anxiety	AA	73(27•8)	[21.7–33.2]	36(21•1)	[15.2–27.8]	31(42•5)	[31.0–53.3]	140(27•6)	[23.7–31.4]
	MA	111(42•2)	[36.7–48.5]	71(41•5)	[33.3–48.7]	26(35•6)	[24.6–46.7]	208(41)	[36.8–45.1]
	MrA	61(23•2)	[18.0–28.6]	54(31•6)	[24.5–38.9]	13(17•8)	[9.8–27.7]	128(25•2)	[21.9–29.2]
	SA	18(6•8)	[3.9–9.8]	10(5•8)	[2.5–9.8]	3(4•1)	[0.0–9.4]	31(6•1)	[4.2–8.2]
	AD	48(18•3)	[13.7–23.0]	28(16•4)	[11.1–22.0]	16(22•5)	[12.7–33.3]	92(18•3)	[14.7–21.7]
Depression	MD	87(33•2)	[28.0–38.5]	57(33•3)	[25.6–40.7]	29(40•8)	[28.8–52.3]	173(34•3)	[29.8–38.2]
	MrD	72(27•5)	[22.0–32.9]	64(37•4)	[30.5–44.8]	17(23•9)	[13.9–33.8]	153(30•4)	[26.4–34.8]
	MSD	46(17•6)	[12.6–22.2]	22(12•9)	[7.9–18.1]	6(8•5)	[2.8–15.7]	74(14•7)	[11.7–18.1]
	SD	9(3•4)	[1.2–5.7]	0(0)	[0]	3(4•2)	[0.0–9.3]	12(2•4)	[1.2–4.0]
	ES	23(8•8)	[5.5–12.3]	12(7•1)	[3.4–11.3]	9(12•7)	[5.6–20.3]	44(8•7)	[6.4–11.3]
Well-being	S	74(28•2)	[22.8–33.7]	29(17•1)	[11.3–22.8]	21(29•6)	[19.4–41.0]	124(24•7)	[20.7–28.6]
	SS	78(29•8)	[24.6–35.1]	42(24•7)	[18.2–31.5]	22(31)	[20.0–42.0]	142(28•2)	[24.3–32.4]
	N	20(7•6)	[4.8–11.2]	15(8•8)	[4.7–13.3]	3(4•2)	[0.0–9.6]	38(7•6)	[5.2–9.9]
	SD	44(16•8)	[12.1–21.5]	38(22•4)	[16.3–29.0]	10(14•1)	[6.5–22.4]	92(18•3)	[14.7–21.9]
	D	20(7•6)	[4.5–11.1]	26(15•3)	[10.1–21.5]	5(7)	[1.6–13.5]	51(10•1)	[7.8–12.9]
	ED	3(1•1)	[0.0–2.7]	8(4•7)	[1.8–8.2]	1(1•4)	[0.0–4.8]	12(2•4)	[1.2–3.6]

T = Total; AA = Absence of Anxiety; MA = Mild Anxiety; MrA = Moderate Anxiety; SA = Severe Anxiety; AD = Absence of Depression; MD = Mild Depression; MrD = Moderate Depression; MSD = Moderately Severe Depression; SD = Severe Depression; ES = Extremely Satisfied; S = Satisfied; SS = Slightly Satisfied; N = Neutral; LD = Slightly Dissatisfied; D = Dissatisfied; ED = Extremely Dissatisfied.

Table 3
Comparison of mental health outcomes by country, level of competition, and age groups.

		Anxiety				Depression				Subjective well-being			
		M [95% CI]	SD	F	η^2	M [95% CI]	SD	F	η^2	M [95% CI]	SD	F	η^2
Country	Cameroon	7•40	4•23	5•08**	0•02	9•71	5•27	2.28	0•01	23•0	5•80	12•7**	0•048
	Côte d'Ivoire	8•04	4•10			9•34	4•60			20•4	6•02		
	Morocco	6•08	4•53			8•27	5•16			23•7	6•30		
CL	Regional	7•57	4•23	1•36	0•01	9•43	5•11	0•15	0	22•7	5•84	9•99*	0•02
	National	7•04	4•36			9•23	4•88			20•8	6•72		
	U13	7•87	3•97			10•2	5•14			23•6	5•69		
Age groups	U15	8•06	3•85	3•16*	0•026	9•84	4•59	2•04	0•01	22•7	6•07	5•61**	0•043
	U17	7•26	4•51			9•05	5•11			22•4	5•85		
	U20	7•25	4•03			9•06	5•30			19•0	5•96		
	U23	5•84	4•96	8•18	5•33	21•2	7•04						

CL = Competition Level.

** $p < .001$.

* $p < .01$.

0•05, competition levels $F(1•501) = 0•15, p > 0•05$, and age groups $F(4•495) = 2•04, p > 0•05$. Furthermore, all the significant differences recorded for anxiety and subjective well-being scores had small effect sizes ($\eta^2 < 0•2$).

The analysis of four solutions (Table 4) shows the three-profile

solution had the best fit statistical indices and theoretical interpretability. The three-profile solution had the lowest BIC, SABIC and CAIC values and the highest entropy value. Latent profile probability was comprised between 0•83 and 0•90, suggesting the profiles had clearly distinguishable characteristics. Moreover, each profile had >50

Table 4

Model fit indices for the latent profile analysis models based on the anxiety, depression and subjective well-being scores.

Solutions	LL	BIC	SABIC	AIC	CAIC	ENT	BLRT	p	Sample proportions	LPP
Two profiles	-4470	9002	8970	8960	9012	0•716	257•1	0•004	0•50; 0•50	[0•91;0•92]
Three profiles	-4441	8969	8925	8910	8983	0•726	57•6	0•020	0•46;0•18;0•36	[0•83;0•90]
Four profiles	-4457	9027	8970	8951	9045	0•571	-32•9	0•721	0•20;0•26;0•21;0•33	[0•70;0•82]
Five profiles	-4431	8998	8928	8905	9020	0•627	53•5	0•036	0•24;0•12;0•18;0•16;0•30	[0•68;0•81]

LL = Log-likelihood; BIC = Bayesian Information Criteria; SABIC = Sample-Adjusted Bayesian Information Criteria; AIC = Akaike Information Criterion; CAIC = Consistent Akaike Information Criterion; ENT = Entropy; BLRT = Entropy, Bootstrap Likelihood Ratio Test; LPP = Latent Profile Probability.

participants and 5% of sample. The three-profile solution is therefore the most informative for understanding athletes' mental health. According to Table 5, the players of Profile 1 were the most represented (45•7%; 95% CI 41•6, 49•7) and characterized by neutral subjective wellbeing scores, mild anxiety and moderate depression scores. Those of Profile 2 were the least represented (18•3%; 95% CI 15.1, 21.9) and characterized by slightly subjective well-being scores, moderate anxiety scores and severe depression scores. Profile 3 (36•1%; 95% CI 32.2, 40.4) was characterized by medium subjective well-being scores, and scores indicating no anxiety and depressive symptoms. On the other hand, the prediction of mental health profile based on players' characteristics (Table 6) shows significant results for country $\chi^2(4) = 13•71, p < 0•01$ and age group $\chi^2(2) = 11•5, p < 0•01$. Specifically, the young players from Côte d'Ivoire have significantly 1•91 (95% CI 1•02, 3•57) and 4•23 (95% CI 1•54, 12•7) times the odds of the players from Morocco of having moderate or languishing mental health conditions respectively. The young players from Cameroon have significantly 3•27 (95% CI 1•17, 9•09) times the odds of the players from Morocco of having languishing mental health conditions. The prediction based on the competition level $\chi^2(2) = 0•20, p > 0•05$, and age of players $\chi^2(2) = 3•20, p > 0•05$, were not significant.

4. Discussion

In line with the study's first aim regarding the prevalence of mental health issues among young talented footballers in these three African countries, the screening results revealed that one third of the players experience low well-being, while two thirds and four fifths experience anxiety and depressive symptoms respectively. Comparison of countries showed that young Ivorians recorded the highest scores and greater proportions of mental health problems. For the competition level, regional-level players had the highest well-being scores. Regarding age groups, the youngest were the most vulnerable to common mental disorders (anxiety and depression) and yet paradoxically experienced more well-being. This result supports the relevance of undertaking epidemiological studies on mental health by profile. The latent profile analysis in line with the second aim suggested three profiles: moderate mental health profile (Profile 1), languishing profile (Profile 2), and flourishing profile (Profile 3). The moderate mental health profile was adequate for almost half of the participants. Furthermore, logistic regression supported that only the country significantly contribute to predicting belonging to a mental health condition profile. Overall, the results highlight that these young elite footballers have vulnerable mental

Table 5

Characteristics of mental health profiles.

	Profile 1 = Moderate mental health		Profile 2 = Languishing			Profile 3 = Flourishing			
	M [95% CI]	SD	n(%) [95% CI]	M [95% CI]	SD	n(%) [95% CI]	M [95% CI]	SD	n(%) [95% CI]
Anxiety	8•44 [8•19-8•70]	1•98		13•6 [13•2-13•9]	1•91		3•04 [2•75-3•34]	2•04	
Depression	10•5 [10•1-11•0]	3•43	230(45•7%) [41•6-49•7]	15•4 [14•7-16•2]	3•66	92(18•3%) [15•1-21•9]	4•87 [4•44-5•30]	2•94	181(36•1%) [32•2-40•4]
Well-being	20•9 [20•3-21•7]	57•2		21•6 [20•2-22•9]	6•74		24•1 [23•2-24•9]	5•91	

Table 6

Prediction of Mental Health Condition profile based on the country, the level of competition and the age group.

	B [95% CI]	SE	Odds Ratio		95% CI for Odds Ratio
			Lower	Upper	
Moderate mental health vs. Flourishing					
Intercept	1•27 [-0•26; 2•80]	0•78	3•55	0•77	16•38
Cameroon (vs. Morocco)	0•10 [-0•48; 0•69]	0•30	1•11	0•62	1•19
Côte d'Ivoire (vs. Morocco)	0•65* [0•02; 1•27]	0•32	1•91	1•02	3•57
Competition level:					
National vs. Regional	-0•05 [-0•54; 0•44]	0•25	0•95	0•58	1•55
Age	-0•08 [-0•17; 0•01]	0•05	0•92	0•84	1•01
Languishing vs. Flourishing					
Intercept	-1•15 [-3•35; 1•05]	1•12	0•32	0•04	2•84
Cameroon (vs. Morocco)	1•19* [0•16; 2•21]	0•52	3•27	1•17	9•09
Côte d'Ivoire (vs. Morocco)	1•49** [0•43; 2•54]	0•54	4•23	1•54	12•7
Competition level:					
National vs. Regional	0•09 [-0•54; 0•71]	0•32	1•09	0•58	2•03
Age	-0•04 [-0•17; 0•08]	0•06	0•95	0•84	1•08

$\chi^2(8) = 18•3, p < 0•05; R^2_{CS} = 0•01; R^2_{MCF} = 0•02; R^2_N = 0•02;$
 * $p < 0•05.$
 ** $p < 0•001.$

health, as supported by previous works [2,4,10].

Subjective well-being and anxiety are the mental health constructs for which significant differences have been identified based on country,

age group, and level of competition, even if these difference were low due to the small effect size. Moreover, there were not any significant differences on the depression scores which would support this low difference. Overall, young talented players in Côte d'Ivoire are more vulnerable to mental health problems than those in Cameroon and Morocco. This finding contrasts with previous studies which estimated the higher prevalence of mental health problems (depression and anxiety) among general population in this three countries: Morocco (37% and 26.5%) [42], Côte d'Ivoire (35% and 14%) [61], and Cameroon (5 to 10%) [46]. The limited studies on mental health in Africa did not allow to claim whether or not this contrast is relevant. However, the socio-political context of Côte d'Ivoire this last 22 years can explain that finding. Between the three studied countries, Côte d'Ivoire is the one that went through two disastrous civic war in 2002 and 2011. Surprisingly, it is also the country where people are happiest [12]. This underlines that elite sport is a specific area where mental health management requires special provisions because, in terms of elite football, Cameroon and Morocco are ahead of Côte d'Ivoire. On the other hand, Morocco achieved more improvements over the time in mental health care facilities [50]. This can explain why it recorded the lower prevalence.

Compared to Europe, African countries are lagging behind in terms of the populations' happiness [12,26]. The prevalence rates identified in the current study support these reports. Indeed, they are higher than those obtained for young elite footballers in Europe and Asia [2,6,15,17,62]. This can be explain by socio-economical, geographical and cultural factors. The studied countries as many other African countries are Low and Middle Income Countries where there is a lack of financial resources to support health system. Consequently, there is shortage of mental health professionals and proliferation of non-conventional facilities [30,50]. In Africa, professional mental health services are mainly located in the big cities leading to unbalance of accessibility [46,61]. Even in those big cities, cultural background of population is another barrier. The causes and treatment of mental illness are associated to beliefs in supernatural power leading to stigma and seeking help from non-professional [27,40,41]. The prevalence of common mental disorders in this study is also higher than those obtain with professional rugby players in South Africa [36]. However, regarding prevalence rates of depression, these comparisons should be taken with caution because the previous studies used the Center for Epidemiological Studies Depression Scale (CES—D) rather than the PHQ-9 recommended by the International Olympic Committee (IOC) [23]. The only study which used PHQ-9 was the one conducted with Australian footballers, which found a prevalence rate still below that of this study [2]. The anxiety and well-being scores obtained in this study support the results for young footballers from Switzerland, Denmark and Sweden, where the youngest were the most anxious and happiest, even though the well-being tool was different [2,6,15]. The results for competition level also support those obtained among young elite footballers in Germany, where players in lower divisions had the highest anxiety score [2].

Three distinctive profiles of complete mental health are adequate in this study. Close to half (45•7%) of participants report moderate mental health, and the minority (18•2%) is flourishing; in contrast, around 181 (36•1%) are languishing while simultaneously facing moderate or severe symptoms of anxiety and/or depression. These profiles support the flourishing-languishing model because the presence of low or moderate well-being does not automatically imply a high degree of common mental disorders, as is the case in Profiles 1 and 3 [14]. Contrary to Keyes's results, the profiles here are dependent on mental illness and not on well-being. Kuettel's work on Danish footballers, based on the same divergence from Keyes, reached similar results to this present study [15,16]. Keyes's seminal work was with the general population, which could explain this difference and reinforce the specificity of elite sport. However, the profiles of Danish players differ from those of African players in terms of the degree of well-being, as in this study Profiles 1

and 2 had similar levels of well-being. Interestingly, the findings of this study support that a player's country can explain their mental health condition profile. The players from Morocco compared to Cameroon and Côte d'Ivoire are less likely to have a moderate and languishing mental health profile. Given that Morocco is the country in Africa that invests the most in sport [29], it most likely provides a better athlete support service. In addition, there is an enhancement in the understanding of mental illness in Morocco [27,50]. It appears that navigating within poor athlete support services has become an additional stressor in sub-Saharan countries [30]. Regardless of the lack of professional services in sub-Saharan countries, attitudes towards help seeking can explain why players from Côte d'Ivoire compared to Cameroon were more likely to have a moderate and languishing mental health profile. Indeed, it has been shown that in Cameroon, patients seek help from professional mental health care more than from informal sources, which is not the case in Côte d'Ivoire [46,51].

This study was mainly limited by using self-reported measurements of mental health conditions, which may be accompanied by biases such as the creation of false internal consistency [15]. Another limitation is the sample, which was limited to French-speaking African countries, with an under-representation of players from Morocco (North Africa). Additional studies with Moroccan footballers are required, as are those integrating countries from other regions of Africa and/or female footballers. These studies will also benefit from using other methods that go beyond self-reported measurements such as mixed-methods approaches. It will be also interesting to study changes in mental health over time through longitudinal study design. Since the country is a predictor of profile membership, the three mental health condition profiles found in this study should be taken with cautious. It will be informative to investigate profiles adjusted to each country. By doing this, future studies should try to extend the country-specific sample size for increasing the probability to include all the vulnerable players. Indeed, the lack of players with severe depressive symptoms in the Côte d'Ivoire's sub-sample may limit the generalizability of the findings. Moreover, it could be also interesting if future studies used the IOC's tools to explore the links between the mental health condition of young African athletes with Talent Development Environments [35] or Psychological Characteristics of developing excellence [34]. Similarly, it could be interesting to test certain hypotheses of the "iGen" model [3] in the African context, for instance by exploring how social media usage influences the mental health condition of young athletes.

Beyond these limitations, the results has some practical implications. This study shows that mental health problems in adolescents and specifically in young elite footballers of studied countries are real. This underlines the need to enhance the awareness of this issues among young players, coaches or educators and parents. An effective way to do this is to carry out mental health literacy programs [63]. Such a program should consider environment, since the results show that Côte d'Ivoire and Cameroon are risky environment than Morocco. Another way is to undertake psycho-education interventions delivered by trained lay persons or professionals [64]. In addition, specific interventions targeting depression and anxiety should be implemented for players with moderate mental health or languishing profiles. International organization like the FIFA and Confédération Africaine de Football (CAF) should encourage football academies to integrate sport psychologists or mental health professionals in their technical team.

5. Conclusion

This study is the first that provide an in depth international data on the young talented footballers' mental health in an African context. It provides evidence regarding differences in the prevalence of mental health problems in the countries studied and elsewhere. The findings suggested three profiles of mental health condition: moderate mental health (Profile 1), languishing (Profile 2), and flourishing (Profile 3). In addition, these profiles are predicted by the country. This prevalence

study can facilitate prevention and management through more appropriate measures. For instance, through an educational intervention this findings can help to break certain stigmas, and consequently change perceptions of mental illness and improve mental health care by raising awareness about mental health issues. Thus, there is an urgent need to stop designing measures for young talented footballers in Africa based on data from elsewhere. The current findings on prevalence and characteristics of mental health condition profiles may be helpful to promote prevention efforts of this kind. For better development of talented African footballers, situated mental health programs are indispensable.

Data sharing

The data is stored in the SWISSUbase repository. It is available upon request to the authors.

CRedit authorship contribution statement

Boris Tachom Waffo: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Denis Hauw:** Writing – review & editing, Validation, Project administration, Formal analysis, Conceptualization.

Declaration of competing interest

We declare no competing interests.

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