Current Psychology (2024) 43:18824–18835
https://doi.org/10.1007/s12144-023-04838-0

Health-related quality of life of young refugees in Germany during the COVID-19 pandemic: comparisons to non-refugees and pre-pandemic times

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Accepted: 3 June 2023 / Published online: 25 July 2023

Abstract

The COVID-19 outbreak forced widespread changes in minors' daily life with a risk of compromising well-being. So far, little is known about how health-related quality of life (HRQoL) of young refugees has developed during this time, although they belong to a vulnerable group. In a cross-sectional analysis during the first year of the pandemic, minors aged 8 to 16 years with and without refugee experience (n each = 156) were surveyed, using self-report questionnaires on HRQoL and perceived COVID-related stress. In a longitudinal analysis with refugee minors aged 8 to 18 years (n = 91) HRQoL and possible relevant predictors (gender, age, duration of stay, mental health) were assessed in 2019 (pre-pandemic). HRQoL was reassessed in 2020 (peri-pandemic). No difference was detected between minors with and without refugee experience in terms of peri-pandemic HRQoL. A proportion of 36% (refugee minors) and 44% (non-refugee minors) reported low peri-pandemic HRQoL. However, refugee minors reported more COVID-related stress (difficulties in following school). Longitudinally, HRQoL of refugee minors increased from pre- to peri-pandemic times. Older age, lower pre-pandemic HRQoL, and pre-pandemic externalizing problem behavior predicted worse peri-pandemic HRQoL. The findings suggest a certain resilience of refugee minors but also show a continued vulnerability. Therefore, minors at risk should be identified and their psychosocial needs addressed.

Keywords Health-related quality of life · Mental health · Refugee · Children and adolescents · COVID-19 pandemic · Longitudinal

Background

The coronavirus (COVID-19) and the measures taken in response to the pandemic have caused widespread restrictions in the daily lives of minors. On average, children worldwide had already lost 54% of a year´s contact time with their teachers by November 2020 (UNESCO Institute for Statistics, 2021). Due to official contact restrictions or because of personal risk evaluations, minors were also restricted in their formal leisure activities as well as in informal meetings with friends and family (Cheng et al., 2020). These restrictions were accompanied by reduced availability of social support resources outside the family (e.g., school social workers, peers, teachers) in case of interpersonal conflicts, mental health crises or domestic violence. In addition to the constraints imposed by the pandemic, COVID-19 related anxieties (e.g., fear of being infected; Luo et al., 2021) and worries about the health of loved ones can also be further burdening factors. Consequently, initial studies showed high rates of depression and anxiety symptoms (Zhou et al., 2020) and lower than normal well-being (Riiser et al., 2020) in adolescents during the COVID-19 pandemic. A recent review underlined the impact of COVID-19 on mental health of minors (Nearchou et al., 2020). Nevertheless, due to the limited methodological quality of existing studies and similar rates of depression and anxiety in some

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pre-pandemic studies, the knowledge about peri-pandemic mental health of minors is restricted (Nearchou et al., 2020). Moreover, peri-pandemic mental health outcomes differ significantly between various countries (Wang et al., 2021). The few existing longitudinal studies tend to indicate a deterioration in several mental health outcomes (Magson et al., 2021; Ravens-Sieberer et al., 2023; Thorisdottir et al., 2021). For example, a recent study with data from Germany reported more mental health problems and lower HRQoL in peri- than pre-pandemic times (Ravens-Sieberer et al., 2023). Some studies showed, however, that well-being during the pandemic was not equally worse for all groups of minors or times. For example, one-third of adolescents reported improved well-being during lockdown (Soneson et al., 2022), whereas a study by Koenig et al. (2023) found no difference between adolescents' pre-pandemic and post-lockdown HRQoL. Therefore, it is critical to identify particularly vulnerable groups of minors during the pandemic in order to provide optimal support to those most in need.

Refugee minors as a particularly vulnerable group during the pandemic

Refugee minors (RM) are a particularly vulnerable group, as they are very likely to have experienced stressful and potentially traumatic life events before or during their escape (Müller et al., 2019a; Scharpf et al., 2021) and post-migration stressors after their arrival in the host countries (Dangmann et al., 2021; Scharpf et al., 2021). A significant proportion of RM manage to cope with these adversities in a way that they are not psychologically distressed, whereby aspects such as having a positive outlook and family connectedness have been identified as promoting resilience (Pieloch et al., 2016). However, for many RM in Germany and other high-income countries the experienced adversities resulted in impaired mental health even before the pandemic and its additional challenges (Dangmann et al., 2022; Fazel et al., 2012; Müller et al., 2019b). Furthermore, previous results showed lower pre-pandemic HRQoL and fewer social resources for RM compared to native minors or minors with migration background (Schmees et al., 2022). Thus, existing evidence clearly showed how burdened many RM were even before the pandemic.

So far, only a few risk factors for adverse mental health outcomes during the pandemic have been identified, but they do suggest an increased risk for RM. For example, previous use of mental health support and food poverty in the past have been associated with adverse mental health outcomes during the pandemic (Mansfield et al., 2021). Even before the pandemic, living in a refugee shelter was associated with decreased life satisfaction and higher levels of distress (Walther et al., 2020). It is plausible that housing conditions have become even more relevant during the pandemic, as limited space (e.g., in shelters) made it difficult to follow hygiene and social distancing advice. For minors in home schooling, the lack of technological devices and internet access (Hüttmann et al., 2020) as well as finding a quiet place to follow school lessons could be further challenges. Consequently, housing was identified as a determinant of COVID-19 inequities (Mehdipanah, 2020) and a German study found an association between small living space and reduced peri-pandemic HRQoL (Ravens-Sieberer et al., 2022b). Further risk factors identified in the latter study could also be applicable for some RM, e.g., migration background, low parental education level, all factors in combination with low reported family climate. These risk factors resulted in higher levels of pandemic-related burdens, lower HRQoL, and more mental health problems (Ravens-Sieberer et al., 2022b). Another risk factor that could be assumed for RM is social isolation due to quarantine or isolation measures, sometimes applied to entire shelters (Biddle et al., 2021). A negative impact of social isolation on mental health was reported in several studies (e.g., Loades et al., 2020). In addition to these pandemic-related risks for impaired mental health, the COVID-19 disease itself particularly affects already disadvantaged groups, like people with low SES or racial and ethnic minority groups (Khanijahani et al., 2021).

The present study

Given the potential accumulation of pandemic-related and unrelated risk factors and low pre-pandemic HRQoL (Schmees et al., 2022), we assumed that RM are, despite their resources, a group with a high risk of unfavorable HRQoL development during the COVID-19 pandemic and that especially RM with impaired pre-pandemic mental health were at risk for low peri-pandemic HRQoL and thus in need for psychosocial support. While for adult migrants and refugees impaired well-being during the pandemic was reported (Garrido et al., 2022), to our knowledge, so far, no study has addressed the peri-pandemic HRQoL of RM. We therefore conducted cross-sectional and longitudinal analyses. In the cross-sectional analyses we examined (1) how minors experienced pandemic-related stress and (2) how HRQoL of RM differed from non-refugee minors' HRQoL during the pandemic. In the longitudinal analyses we examined (3) how HRQoL of RM changed longitudinally (before vs. during the pandemic) and identified (4) predictors of impaired peri-pandemic HRQoL.

Cross-sectional analyses

The HRQoL of RM was compared with the HRQoL of an age and gender matched comparison group (control minors, CM) during the first year of the pandemic. We expected that perceived pandemic-related stress was associated with impaired HRQoL for both groups, CM and RM. Because of the multiple possible risk factors for RM described above we expected higher levels of pandemic-related stress, and lower HRQoL for RM than for CM. Therefore, our hypotheses for the cross-sectional analyses are:

Hypothesis 1: HRQoL correlates negatively with COVID-related stress for both, RM and CM.
Hypothesis 2: The HRQoL of RM during the COVID-19 pandemic is lower than the HRQoL of CM.
Hypothesis 3: RM report higher levels of COVID-related stress than CM.

Longitudinal analyses

Longitudinal analyses were conducted to assess changes in HRQoL of RM from pre- to peri-pandemic times and to identify pre-pandemic risk factors, particularly related to pre-pandemic psychological distress, that predict impaired HRQoL during COVID-19. Consistent with the decline in well-being and life satisfaction among non-refugee minors during the pandemic reported in other studies (e.g., Magson et al., 2021; Ravens-Sieberer et al., 2022a, 2022b), we expected a decline of HRQoL among RM. Additionally, we assumed that peri-pandemic HRQoL was predicted by pre-pandemic risk factors. Therefore, our hypotheses for the longitudinal analyses were:

Hypothesis 4: HRQoL of RM decreases from pre- to peri-pandemic times.
Hypothesis 5: Pre-pandemic psychological distress predicts peri-pandemic HRQoL of RM, over and above the influence of age, gender, length of stay and pre-pandemic HRQoL.

Methods

Samples

The cross-sectional analyses included data from two samples, RM and CM. The longitudinal analyses are based solely on a RM sample (see Table 1), with the RM samples for both analyses overlapping to a large extent.

Refugee minors (cross-sectional and longitudinal analyses)

RM were recruited in accommodations for refugees and schools in two regions in Germany (Baden Wuerttemberg, North Rhine-Westphalia) between March and December 2020 as part of the YOURGROWTH study, funded by the German Federal Ministry of Education and Research (grant number 01GL1749A/01GL1749B). The aim of the

Table 1 Socio-demographic characteristics of participants (cross-sectional and longitudinal analyses)

	Cross-sectional		Longitudinal
	Refugee minors ($n = 156$)	Control minors ($n = 156$)	Refugee minors ($n = 91$)
Age (years), *M* (*SD*)	12.37 (2.30)	12.32 (2.28)	12.45 (2.90)[a]
Unaccompanied, *n*	2		4
Gender, *n* (%)			
Male	88 (56.4)	88 (56.4)	52 (57.1)
Female	68 (43.6)	68 (43.6)	39 (42.9)
Arrival in Germany, *n* (%)			
Till 2015/16	82 (52.6)		48 (52.7)
After	71 (45.5)		43 (47.3)
Missing	3 (1.9)		
Country of origin, *n* (%)			
Syria	92 (59.0)		48 (53.3)
Iraq	37 (23.7)		24 (26.7)
Afghanistan	24 (15.4)		18 (20.0)
Missing	3 (1.9)		

The longitudinal analysis (2019–2020) included all participants from the cross-sectional analysis (2020) with complete datasets for follow-up and additionally further participants aged 17 to 18 years

[a] Baseline assessment

YOURGROWTH research project was to identify resources associated with favorable developmental trajectories of RM after their arrival in Germany and risk factors associated with less favorable adjustment processes.

For the RM sample, the inclusion criteria were: refugee experience, countries of birth Syria, Iraq, or Afghanistan (representing the most common countries of origin for refugees in Germany, when the study was conceptualized; Federal Ministry of the Interior and Community, 2020), having lived in Germany for a maximum of five years, and age between 8 and 16 years (cross-sectional; parallel to the sample of CM) and between 8 and 18 years (longitudinal) respectively. For the cross-sectional analyses, initially $n = 175$ RM were recruited. Four participants were excluded because of missing data for age and gender. Another 15 participants were excluded because of missing values in the primary outcome measure (KIDSCREEN-10; Ravens-Sieberer et al., 2010) resulting in a final sample of $n = 156$ RM (see Table 1) for the cross-sectional analyses. Participants with completed KIDSCREEN-10 were significantly older than those excluded due to missing values ($p \leq 0.001$), but did not differ with respect to gender ($p = 0.443$).

The longitudinal analyses initially included all RM ($n = 120$) who participated at the baseline measurement of the YOURGROWTH study in 2019 (prior to the pandemic) and re-participated at a one-year follow-up data collection in 2020 (first year of the pandemic). Three participants had to be excluded from the longitudinal analyses because age information was missing or did not match for both data assessment points. If age was available for one data assessment but not for the other, the second one was substituted with ± one year. After mean imputation for the primary outcome (KIDSCREEN-10; Ravens-Sieberer et al., 2010; see section Measures), 26 participants still had missing values in this measure for one of the assessments and were therefore excluded from further longitudinal analyses. The final sample for the longitudinal analyses included $n = 91$ RM (see Table 1). Most of the minors had been living in Germany for 3.5 to 4 years. 52.7% of participants arrived in Germany by 2015/2016 and 47.3% thereafter. Participants with completed datasets for KIDSCREEN-10 at both measurement points and those excluded because of missing values did not differ regarding age ($p = 0.801$) or gender ($p = 0.960$).

Control minors (cross-sectional analyses)

Children were recruited in schools ($n = 503$) between November and December 2020. To avoid an overlap between the two samples, the countries of birth Syria, Afghanistan, and Iraq ($n = 10$) were excluded from the analyses. Three participants each were excluded from the analyses because of missing data for age or gender or because they had specified "diverse" as their gender (no RM listed being diverse as their gender). Another four participants were excluded from the analyses because of missing values in the primary outcome (KIDSCREEN-10; Ravens-Sieberer et al., 2010), resulting in a sample of $n = 480$ CM for matching (see Table 1). 14% of CMs indicated a country of origin other than Germany. Regarding the parents' country of birth, CM reported both parents were born in Germany (58%), one parent was born in a different country (14%), and both parents were born in a different country (27%). The percentage of CM with migration background (41%) is thus nearly representative for the 39% of children in Germany having a migration background in 2020 (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, 2020). CM with completed KIDSCREEN-10 did not differ from those excluded because of incomplete KIDSCREEN-10 data, regarding age or gender ($p = 0.601/0.383$, respectively). The CM and RM samples were matched 1 to 1 for age and gender, using R 4.05 (R Core Team, 2021) and the MatchIT package (Ho et al., 2011), resulting in a final sample of $n = 156$ CM.

Procedure

Written informed consent was obtained from parents/guardians prior to the start of the study. Additionally, all participants gave their consent and were informed that participation is voluntary, and answers would be analyzed completely anonymously. The study was approved by the ethics board of the participating universities.

RM had the option to contact trained staff in case of emerging burden during or after data collections, preferably in the participants' first language (either in person or via phone). Additionally, they were given information on who to contact if they needed mental health care. For CM, data collection was supervised by teachers or trained research assistants. The questionnaire was available either in paper–pencil, online on their own device or offline on a tablet (the latter only for RM). For the tablet-based and online version, the software Question Pro (QuestionPro, 2019) was used. RM could choose to fill out the questionnaire in German or in their first language (Arabic, Dari, Kurmancî, Sorani or Pashto) and had the option to listen to the questions to ensure data quality even with low literacy skills. For CM the questionnaire was available in German. For the peri-pandemic data-collections, part of the data was collected on site in small groups, and part of the questionnaires were sent by mail or online respectively. RM received a € 20 voucher.

Context of the data-collection

Data for the pre-pandemic baseline measurement of the RM sample was collected in schools and accommodations for refugees in 2019. Data for the peri-pandemic measurement was collected approximately one year after the first data

collection, between March and December 2020. The CM data collection lasted from November to December 2020. Despite the incomplete temporal overlap, COVID-related limitations in Germany were quite comparable. Schools were closed from mid-March till May and then only reopened gradually (for example, starting with alternating classes; Cheng et al., 2020). After a short phase of relatively normal schooling after the summer vacations, from November on there were again high percentages of school closures, depending on local incidence rates (Cheng et al., 2020). Contact restrictions (predominantly to two households), restrictions on leisure activities, and social distancing rules were in place throughout the data collection period, with the most pronounced restrictions lasting from March to June and November to December (Cheng et al., 2020).

Measures

All questionnaires were self-report measures. In addition to the described measures, a brief demographic questionnaire was administered. Because some participants had difficulties with the question regarding the length of stay in Germany, it was rephrased in a simplified way during data collection process and consequently was only evaluated in a dichotomized manner (about three years or shorter referring to baseline versus longer). Due to the COVID-19 pandemic, only a reduced set of measures was used for the peri-pandemic data collection.

Health-related quality of life (pre- and peri-pandemic)

HRQoL was assessed using the *KIDSCREEN-10* (Ravens-Sieberer et al., 2010) referring to social, mental, and somatic aspects of well-being, represented in one global score (10 items, 5-point response scale ranging from *never* to *always* or *not at all* to *extremely*). The internal consistencies (Cronbach's alphas) in the cross-sectional analysis were $\alpha = 0.73/0.84$ for RM/CM and in the longitudinal analysis $\alpha = 0.82/0.75$ for baseline/follow-up. For a maximum of 2 missing values (out of 10), the mean value of the respective child was substituted (91% of all participants missed no item, 86% of RM, 96% of CM).

Perceived COVID-related stress (peri-pandemic)

The *Perceived COVID-Related Stress Scale for Children and Adolescents* is a self-constructed scale with four items (e.g., "It is difficult for me to follow school, because of the corona situation", with a 5-point response scale ranging from *not true at all* to *totally true* plus *I don't know* option), based on questions of the JuCo-Study (Andresen et al., 2020). The internal consistencies in the present study were $\alpha = 0.74/0.55$ for RM/CM, respectively.

Internalizing and externalizing behavior (pre-pandemic, only RM sample)

The *Hopkins Symptom Checklist-37 for Refugee Adolescents* (*HSCL-A*; Bean et al., 2007a) was used to measure internalizing symptoms (25 items, comprising depression and anxiety, Cronbach's $\alpha = 0.92$) and externalizing behavior (12 items, comprising substance use, oppositional defiant disorder, and conduct disorder, $\alpha = 0.70$). Participants indicated on a 4-point scale (from *never* to *always*) how often they had experienced the symptoms during the last month. Missing values were replaced by extrapolation from the mean value of the corresponding subscale (maximum one missing response on the subscale externalizing behavior, maximum two missing values on the subscale internalizing symptoms). For children aged under 13 years, one item relating to loss of sexual interest was not part of the questionnaire.

Traumatic events (pre-pandemic, only RM sample)

The *Stressful Life Events Checklist* (*SLE*; Bean et al., 2004) was developed for RM and asked for the lifetime experience of 12 different types of traumatic events (*yes*/*no* response). An additional open-ended question asked about traumatic events not queried previously. Responses to the open-ended question were reviewed by experienced psychologists and were included in the analyses if they were classified as potentially traumatic. All experienced traumatic events were added to calculate a sum score.

Statistical analyses

As a pre-analysis (see section Samples) participants with and without complete data for the primary outcome (KIDSCREEN-10; Ravens-Sieberer et al., 2010) were compared using independent *t*-tests and $\chi 2$-tests. For the main cross-sectional analyses, we performed Pearson's correlations, point biserial correlations, *t*-tests, and multivariate analyses of variance for comparisons between groups (RM, CM) regarding HRQoL and COVID-related stress.

For the longitudinal data, participants with complete datasets for both measurement points were compared with those who had dropped out, using independent *t*-tests and $\chi 2$-tests (see section Sample). To compare the HRQoL of RM between pre- and peri-pandemic times, paired-sample *t*-tests were calculated and corresponding effect sizes were reported with Cohen's *d*. In addition, comparable to the procedure of the COPSY study (Ravens-Sieberer et al., 2022b), reference scores from the BELLA study (Barkmann et al., 2021), the mental health module within the German National Health Interview and Examination Survey for children and adolescents, were used for grouping participants in low (*T*-value < 40), normal (*T*-value 40–59.9) or high (*T*-value ≥ 60) KIDSCREEN-10

values; for comparisons, McNemar-tests were performed. A multiple hierarchical regression analysis was computed to identify predicting variables of peri-pandemic HRQoL. Age, gender, duration of stay and pre-pandemic HRQoL were entered in the first step and all other predictors (pre-pandemic internalizing symptoms, externalizing behavior, traumatic events) were included stepwise in the second step. Prior to regression analyses, correlations for all variables were calculated and a power-analysis with G-Power 3.1 software was conducted (Faul et al., 2009). Testing with α error probability < 0.05 and a power of 1 − β error probability of 0.80 for a medium (or large) effect of $f^2 = 0.15$ (or 0.35) resulted in a required sample size of 103 (or 49) for 7 predictors. Relevant assumptions for the regression model were checked and did not result in any multicollinearity problems (VIF < 2 for all predictors). Case by case diagnosis resulted in a leverage > 0.2 for two cases but as Cooks distance was < 1 and no case had a standardized residual > 3, all cases were included in the model. Homoscedasticity and normally distributed errors were visually checked and none of the assumptions were violated. Data were analyzed using IBM SPSS Version 27.

Results

Correlations

All correlations for peri-pandemic cross-sectional data are shown in Supplementary Table 1. As hypothesized in Hypothesis 1, HRQoL (KIDSCREEN-10) correlated negatively with perceived COVID-related stress ($r_{RM} = -0.24$, $p = 0.012$; $r_{CM} = -0.37$, $p < 0.001$).

Group comparisons

Group comparisons are presented in Table 2. Contrary to Hypothesis 2, for HRQoL during the COVID-19 pandemic, no differences between RM and CM were found regarding the mean score ($p = 0.191$) nor for the proportion of participants in the low, normal, or high HRQoL groups ($p = 0.234$). A proportion of 35.9% of RM and 43.6% of CM reported low HRQoL.

Regarding Hypothesis 3, assuming that RM report higher levels of COVID-related stress than CM, a difference was found between RM and CM for COVID-related stress sum scores ($p = 0.015$). Inspecting at the item level (with Bonferroni-corrected p-value), significantly higher COVID-related stress for RM than for CM was found for one out of the four COVID-related stress items (more difficulties in follow school, see Table 2).

Changes in HRQoL from pre- to peri-pandemic time

Longitudinal results are shown in Table 3. Contrary to Hypothesis 4, HRQoL of RM increased significantly from 2019 (pre-pandemic) to 2020 (peri-pandemic follow-up, $p < 0.001$) and the percentage of RM with low HRQoL scores decreased from 54.9% to 38.5% (McNemar $\chi^2 = 5.60$, $df = 1$, $p = 0.018$).

Table 2 HRQoL and COVID-related stress of refugee and control minors (cross-sectional)

	Refugee minors	Control minors	$F(df)$/ $t(df)$/$\chi^2(df)$	p	d
HRQoL (Kidscreen-10 Index) RM $n = 156$, CM $n = 156$, *M (SD)*	39.39 (6.10)	38.41 (7.05)	-1.31 (310)	.191	-0.15
Subjects with low HRQoL[a]	35.9%	43.6%	2.90 (2)[b]	.234	
Subjects with normal HRQoL[a]	52.6%	43.0%			
Subjects with high HRQoL[a]	11.5%	13.5%			
COVID-Stress Sum RM $n = 110$, CM $n = 133$, *M (SD)*	11.42 (4.58)	10.14 (3.57)	-2.45 (241)	.015	-0.32
I feel bad when I think about the coronavirus.[c] *M (SD)*	3.12 (1.56)	2.67 (1.39)	5.66 (1, 242)	.018	
I am worried that I will catch the coronavirus or that I will infect someone else with it.[c] *M (SD)*	3.18 (1.67)	3.22 (1.49)	0.33 (1, 242)	.857	
I feel lonely because of the corona time.[c] *M (SD)*	2.41 (1.49)	2.11 (1.31)	2.86 (1, 242)	.092	
It is difficult for me to follow school, because of the corona situation.[c] *M (SD)*	2.71 (1.51)	2.14 (1.31)	9.79 (1, 242)	.002[d]	

[a]Low, normal, and high HRQoL (health-related quality of life) scores were computed in accordance with a German norm sample (Barkmann et al., 2021). [b]χ^2-statistics for frequencies

[c]For inspecting the individual items, multivariate analysis of variance were performed (COVID-Stress items: $p = .007$, Partial eta$^2 = .06$). [d]Significant after Bonferroni correction ($p = .05/4$)

Table 3 Longitudinal results for pre- and peri-pandemic HRQoL among refugee minors

	Pre-pandemic baseline, 2019 ($n=91$)			Peri-pandemic follow-up, 2020 ($n=91$)					
	M (SD)	Participants with		*M (SD)*	Participants with		Change score *M (SD)*	*t(df)*	*d*
		low HRQoL[a]	normal /high HRQoL[a]		low HRQoL[a]	normal /high HRQoL[a]			
HRQoL (Kidscreen-10 Index)	34.91 (8.47)	54.9%	45.1%	38.78 (6.41)	38.5%	61.6%	3.87 (8.62)	4.29 (90)*	0.45

[a]Low, normal, and high HRQoL (health-related quality of life) scores were computed in accordance with a German norm sample (Barkmann et al., 2021)

*$p \leq .01$

Regression analyses

Descriptive statistics for the pre-pandemic symptom scales are shown in Supplementary Table 2 and bivariate correlations for longitudinal data in Supplementary Table 3. Pre-analyses show, that HRQoL of RM during COVID-19 pandemic significantly correlated with baseline HRQoL ($r=0.36$, $p=0.001$), prior internalizing symptoms ($r=-0.38$, $p=0.001$), externalizing behavior ($r=-0.34$, $p=0.002$), traumatic events ($r=-0.29$, $p=0.005$), and age ($r=-0.42$, $p<0.001$). There were no significant associations with gender ($p=0.234$) and duration of stay in Germany ($p=0.086$).

Results of the regression analysis are reported in Table 4. Age and baseline HRQoL predicted peri-pandemic HRQoL (Step 1), overall $R^2=0.31$, $F(4, 74)=8.10$, $p<0.001$. Gender and the duration of stay in Germany showed no significant associations. When pre-pandemic risk factors (internalizing symptoms, externalizing behavior, traumatic events) were entered (Step 2), there was a 5% increase in explained variance in HRQoL, $F(1, 73)=5.68$, $p=0.020$. The final regression equation was significant, $R^2=0.36$, $F(5, 73)=8.03$, $p<0.001$. Overall, older age, lower HRQoL prior to the pandemic, and more prior externalizing behavior predicted worse HRQoL during the pandemic in RM. Internalizing symptoms and traumatic events were no additional predictors. Accordingly, Hypothesis 5, assuming that pre-pandemic psychological distress predicts peri-pandemic HRQoL of RM, was partially confirmed.

Table 4 Hierarchical linear regression analysis for peri-pandemic HRQoL at T2

Variable	*B*	95% CI for *B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Step 1 (Enter)						.31	.31***
Constant	41.15***	32.81	49.49	4.19			
Gender[a]	0.58	−1.97	3.14	1.28	.05		
Age	−0.88***	−1.31	−0.45	0.22	−.40***		
HRQoL (T1)	0.24***	0.09	0.39	0.08	.32**		
Arrival in Germany[b]	−1.43	−3.93	1.08	1.26	.11		
Step 2 (Stepwise)						.36	.05*
Constant	50.71***	39.33	62.08	5.71			
Gender[a]	0.70	−1.78	3.18	1.24	.06		
Age	−0.92***	−1.34	−0.50	0.21	−.42***		
HRQoL (T1)	0.16	0.00	0.32	0.08	.21*		
Arrival in Germany[b]	−1.07	−3.51	1.38	1.23	−.08		
Externalizing behavior (T1)	−0.42*	−0.77	−0.07	0.18	−.25*		

[a]0 = female, 1 = male. [b]0 = till 2015/2016, 1 = after. CI = confidence interval, LL = lower limit, UL = upper limit

T1 = pre-pandemic baseline (2019), T2 = peri-pandemic follow-up (2020)

Excluded variables in Step 2: Internalizing behavior (T1), traumatic events (T1)

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

Discussion

To the best of our knowledge, this is the first study examining the HRQoL of RM during the COVID-19 pandemic. As expected, peri-pandemic HRQoL was significantly associated with COVID-related stress in both groups, RM and CM (Hypothesis 1). According to the assumed accumulation of risk factors, we expected lower HRQoL for RM compared to CM. However, this difference was not evident for HRQoL (Hypothesis 2) and was only of small magnitude for COVID-related stress (Hypothesis 3). More than one third of the participants in both samples, RM and CM, reported low HRQoL (according to pre-pandemic German norm data; Barkmann et al., 2021). In contrast, in a pre-pandemic study the HRQoL of RM was lower than that of a comparison group (Schmees et al., 2022). Thus, the results can be interpreted as indicating that the peri-pandemic burden of non-refugee minors has resulted in a convergence of the average HRQoL of the two groups, resulting in low HRQoL for both, RM and CM. Moreover, certain characteristics of our sample of RM (rather young average age of about 12 years, all but two participants of the cross-sectional sample are accompanied refugees, comparatively secure residence status due to the countries of origin) could partly explain that the results were more positive than expected, as older age, insecure residence status, and being unaccompanied are well-known risk-factors (Fazel et al., 2012; Müller et al., 2019a).

Longitudinally, contrary to Hypothesis 4, HRQoL of RM increased from the year before the pandemic to the first year of the pandemic. Thus, while before the pandemic, more than half of the minors reported low HRQoL, during the pandemic slightly more than one-third did. The regression analysis showed no significant prediction of HRQoL by dichotomized duration of stay in Germany such that positive adjustment could not be predicted by longer stays in the host country in this study. The interpretation of this variable in our study was complicated by dichotomized recording due to imprecise data. Nevertheless, the results are in line with a recent review concluding that the time spent in the host country showed no added predictive value regarding psychological distress in unaccompanied RM (Höhne et al., 2022) and another review, including both, unaccompanied and accompanied RM, reporting inconsistent findings (Scharpf et al., 2021).

Internalizing symptoms, externalizing behavior, and traumatic events (recorded in each case before the pandemic), which are well-evaluated risk factors (Bean et al., 2007b; Fazel et al., 2012; Müller et al., 2019b), were associated with lower peri-pandemic HRQoL. However, when considered together in the regression analysis, especially externalizing behavior (i.e., substance use, oppositional defiant disorder, and conduct disorder) had a predictive effect on impaired HRQoL during COVID-19. This is of practical relevance as externalizing behavior is visible to outsiders and therefore could particularly help to identify minors struggling with the challenges of the pandemic. For internalizing symptoms, the finding was consistent with another German study in which depression and anxiety symptoms also did not predict pandemic-related burden (Brailovskaia & Margraf, 2020).

Resources and stressors of RM

Pandemic-related effects (i.e., better HRQoL despite or due to the pandemic), especially regarding demands and resources, appear relevant. Initial peri-pandemic studies highlighted the relevance of adaptive coping strategies (e.g., physical activity; Pigaiani et al., 2020) and personal resources (sense of coherence; Dymecka et al., 2022) for peri-pandemic well-being. Among resilient minors, positive changes in different areas of life (e.g., more attention to personal somatic health, more time to cultivate new hobbies) have been reported during the pandemic (Li et al., 2022). However, previously mentally distressed minors might also partly have benefited from the pandemic-related changes (Hollenstein et al., 2021). In a Canadian longitudinal study, a decrease in anxiety during the pandemic was found, whereby the authors argue that this may be caused by a higher availability of experiences that provide relief from anxiety and by a lower exposition to stressors (Hollenstein et al., 2021). To our knowledge, there are no corresponding data for RM during the pandemic. But based on pre-pandemic data from Solberg et al. (2022), showing that the pre-pandemic HRQoL of RM was impaired compared to a European reference sample with respect to peers and social support, we can deduce that pandemic-related circumstances may have brought a relief for these HRQoL dimensions. Consistent with this reasoning, less peer-related problems such as loneliness, exclusion or bullying could serve as an explanatory approach for higher well-being during the pandemic (Soneson et al., 2022). Moreover, pandemic-caused contact restrictions might have resulted in less contact with the host society, and thus might have brought relief especially for those RM struggling with acculturative hassles such as perceived discrimination. This interpretation would be in line with Keles et al. (2018) showing that the extent of experienced acculturative hassles distinguish between the groups of vulnerable and resilient RM (characterized by an increase or decrease in psychopathology over time, respectively) and would thus combine the resilience perspective and the role of stressors. Besides the assumed reduction of stressors during the pandemic, RM may have benefited from their particularly pronounced resources (e.g., high levels on the HRQoL dimension parent relations, Solberg et al., 2022)

and the greater relevance the parent relationship is likely to have taken in the pandemic, as positive and close relationships with parents were shown to support resilience and coping of children with adversities (for an overview see Prime et al., 2020). Thus, an interplay of reduced stressors that are assumed to be particularly relevant for RM and distinct resources of RM might explain the improvement in HRQoL in our RM sample. Future studies could explore this in more detail.

Despite the improvement in HRQoL for RM over time, still about one third of RM (and a comparable number in the comparison group) reported a low peri-pandemic HRQoL. Thus, the proportion of low HRQoL among both groups, CM and RM, were in line with the reported 40% of minors with low peri-pandemic HRQoL in a large population-based German study (Ravens-Sieberer et al., 2022b). However, in the latter study only about 15% of the participants showed a low HRQoL in pre-pandemic times, compared to more than 50% of RM in our sample. We therefore conclude that, despite the increase in HRQoL in RM from pre- to peri-pandemic times, in both groups (with and without refugee background), a high proportion was in a particular burdening situation during the pandemic. Accordingly, a need for psychosocial and psychotherapeutic support can nevertheless be assumed.

Our study further identified a specific stressor, particularly perceived by RM: RM reported higher levels of difficulties to keep up in school during the pandemic. This is in line with a previous study reporting difficulties with schoolwork due to language problems as a post-migration stressor associated with HRQoL of RM (Dangmann et al., 2021). In pandemic-caused distance learning, the educational background but also the need for a quiet place to study, sufficient technical infrastructure, and language skills became particularly relevant (Goudeau et al., 2021; Lassoued et al., 2020). To achieve educational and health justice in times of a pandemic, the needs of refugee minors must be addressed. This could be realized, for example, by providing emergency care, remote psychotherapy (e.g. Markowitz et al., 2021) and remote alternatives for school psychology services, as well as technical infrastructure and workspaces in shelters.

Strengths and limitations

A major strength of our study is the combination of longitudinal and cross-sectional data, which allowed valid comparisons of peri-pandemic HRQoL of RM with both pre-pandemic data of RM and peri-pandemic data of non-refugee minors as well as the use of the KIDSCREEN-10, allowing a comparison with existing population-based norm data.

A critical point in our study was the imprecise assessment of the length of stay in Germany and the resulting analysis in dichotomized form. Nevertheless, it can be assumed that other risk and protective factors might be more relevant for HRQoL than the time spent in the host country. Another limitation is the restriction of the sample to RM from Syria, Iraq, and Afghanistan. Accordingly, our findings can only be applied to a limited extent to minors from other countries of origin, even though refugees from Ukraine, for example, are also a large and psychologically distressed group, with RM from Ukraine reporting lower well-being than representative German samples (Brücker et al., 2023; Chudzicka-Czupała et al., 2023). Due to the dynamic evolution of the pandemic, our study has some further limitations. The study was adapted when pandemic-specific scales were not yet available, resulting in the use of an ad-hoc constructed scale with partly low reliability, analyzed also at the level of individual items. Furthermore, the cross-sectional and longitudinal RM sample differ slightly, due to the different age structure and missing values. Our results reflect the situation in Germany during the first year of the pandemic. As the data collection took place over several months, results cannot be attributed to specific pandemic control measures. The transferability of the results to other phases of the pandemic or countries with deviating COVID incidences and measures against the disease may be limited. Considering the phase of the pandemic in interpretation might be particularly relevant because the few studies with multiple measurements during the pandemic showed that outcomes developed dynamically (Gijzen et al., 2020; Ravens-Sieberer et al., 2022a). At the same time, however, there is also some evidence that changes in the HRQoL and mental health of minors during the first year of the pandemic were less pronounced and partly negligible (especially when compared to pre-pandemic results, e.g., Ravens-Sieberer et al., 2022a). Even though the longitudinal design was a strength of the study, the time span covered might have been too short to capture mental health effects due to the pandemic, which may result in the long run, as for example discussed by Figueiredo et al. (2021).

Conclusion

In contrast to expectations, RM reported an increase in HRQoL from pre- to peri-pandemic times and a peri-pandemic HRQoL comparable to non-refugee minors. Older age, lower pre-pandemic HRQoL and pre-pandemic externalizing behavior problems predicted lower peri-pandemic HRQoL. It can be assumed that some refugees developed resources that enabled them to adapt despite the multiple challenges of the pandemic. Besides these partly positive results, more than one third of RM and a comparable number of CM still reported low HRQoL reflecting a need for psychosocial support in both groups. Given the continued vulnerability of refugee minors during the pandemic, there is a need to identify particularly vulnerable minors and to address their psychosocial needs.

Abbreviations *CM*: Control minors; *RM*: Refugee minors; *HRQoL*: Health-related quality of life

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12144-023-04838-0.

Acknowledgements The authors would like to thank all participating children and adolescents as well as all students involved in the data collection process. None of the authors have any refugee experience themselves, therefore we would like to thank the student assistants with refugee experience who provided valuable feedback during the study design and data collection process.

Authors' contributions JB analyzed the data and prepared the manuscript. JB, PS and HE interpreted the results. All authors were involved in selection of measurement instruments and study implementation for RM data. For CM data HE, PS, and JB were involved in selection of measurement instruments and study implementation. All authors were involved in critical revision of the manuscript. All authors read and approved the final manuscript.

Funding Open Access funding enabled and organized by Projekt DEAL. All data of refugee minors were collected as part of the YOURGROWTH-Project funded by the German Federal Ministry of Education and Research. Grant number 01GL1749A/01GL1749B. The article processing charge was funded by the Baden-Württemberg Ministry of Science, Research and Culture and the University of Education Schwäbisch Gmünd in the funding program Open Access Publishing.

Data availability The data that support the findings of this study are confidential, but available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate The study was approved by the ethics board of the participating universities according to the ethical guidelines of the German Psychological Society (DGPs) and the German Association of Psychologists (BDP). Participation was voluntary, and informed consent was obtained from both the children/adolescents and their parents or guardians.

Consent Written informed consent was obtained from parents/guardians prior to the start of the study. Additionally, all participants gave their consent and were informed that participation is voluntary and answers would be analyzed completely anonymously.

Competing interests On behalf of all authors, the corresponding author states that there is no conflict of interest.

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