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ARTICLE

Mistreatment at work and musculoskeletal pain in male and female working Syrian refugee children

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ABSTRACT

Since the Syrian war in 2011, Syrian refugees in Lebanon have continued to experience socioeconomic deprivation, resorting many families to child labour as a form of survival. Adopting a gender-sensitive analysis, this study explores the relationship between psychosocial adversities and musculoskeletal pain among male and female Syrian refugee children in Lebanon, using data from a cross-sectional survey of working Syrian refugee children between 8 and 18 years in informal tented settlements in the Bekaa Valley of Lebanon. The majority of working children (4090) worked in agriculture (75.8%). Of the children who experienced musculoskeletal pain, 27.4% worked despite severe pain, three-quarters of the children worked under time pressure, over a third (37.4%) were physically abused at work, and the majority (95.8%) had a good relationship with their co-workers. Logistic regression models revealed a significant association between exposure to psychosocial stressors at work and musculoskeletal pain among male and female children.

Practitioner summary: This study is the first to obtain direct testimony on musculoskeletal pain and psychosocial risk factors, among Syrian refugee children in Lebanon. Using a gender-sensitive analysis, the survey results demonstrated associations between exposure to psychosocial stressors and musculoskeletal pain among male/female Syrian refugee children enduring strenuous working conditions.

Abbreviations: FAO: Food and Agriculture Organization of the United Nations; ITS: informal tented settlements; IRB: institutional review board; IDRC: international development research centre; ILO: international labour organisation; SD: standard deviation; UN: United Nations; UNHCR: United Nations High Commissioner for Refugees; UNICEF: United Nations International Children's Emergency Fund

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Introduction

In March 2011, the protracted conflict in Syria began, leading to detrimental consequences to the Syrian population. This has resulted in 6.6 million Syrian refugees worldwide, 5.6 million of whom are hosted in countries near Syria (UNHCR 2021). Lebanon hosts the highest number of refugees per capita with an estimated total of 1.5 million Syrian refugees in the country, mostly residing in informal tented settlements (ITS) in the Bekaa Valley, which makes up to 42% of Lebanon's total farmed land and borders Syria (UNHCR 2020; Verner et al. 2018). In general, farm owners in Lebanon's agricultural sector depend on low-wage jobs to boost profits and hire Syrian refugees, especially children, who will accept lower wages as a result of their undocumented legal status and economic hardship (Turkmani and Hamade 2020). Syrian refugee children are thus at risk of physically demanding work and hazardous exposures (Habib et al. 2020a). In a context of economic hardship and legal instability, child labour has become a means of survival for struggling Syrian families.

Much of the literature has focussed on the tribulations faced by child workers; however, additional research is particularly needed on the consequences of child labour in humanitarian settings, and, more generally, in low- and middle-income countries (Habib et al. 2019; Ibrahim et al. 2019). Syrian refugee communities in Lebanon continue to be susceptible to child labour as they endure socioeconomic deprivation and precarious living conditions. At work, refugee

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workers are at risk of harm as a result of the physical and emotional adversities they experience in unregulated contexts; notably, gender affects the tasks performed and the experiences resulting from workplace exposures that are influenced by health and safety outcomes of child workers (Habib et al. 2020a). Therefore, a gendered analysis is necessary to understand the different effects of adversities on male and female refugee child workers.

A large proportion of Syrian refugee children in Lebanon work in agriculture, exposing them to hazardous and physically demanding work, involving strenuous physical activities and high levels of manual labour (Osborne et al. 2012b). Farm workers are particularly vulnerable to the development of musculoskeletal disorders prevalent in working populations exposed to physical and psychosocial stressors (Osborne et al. 2012a); notably, migrant workers are particularly vulnerable due to the pressure and anguish of their working conditions (Hansen and Donohoe 2003; Moyce and Schenker 2018).

Psychosocial risk factors associated with musculoskeletal pain among agricultural workers in low- and middle-income countries consist of stress, lack of social support, lower education level, and lower monthly income (Kumaraveloo and Lunner Kolstrup 2018). Working overtime and reduced resting hours are also associated with musculoskeletal pain (Kumaraveloo and Lunner Kolstrup 2018; Taibi et al. 2021). High job strain, high hindrance stressors, and workplace bullying are also risk factors for musculoskeletal pain (Taibi et al. 2021). These factors are particularly relevant to the humanitarian settings in Lebanon, in which Syrian refugee child workers face harsh working conditions, and demanding and hazardous work (Habib et al. 2021).

In this study, we analysed the association between psychosocial adversities experienced at work and musculoskeletal pain among Syrian refugee child workers living in the Bekaa Valley of Lebanon. We adopted a gender-sensitive approach by disaggregating the data on male and female children. The study assesses the importance of addressing psychosocial adversities, along with physical exposures, to investigate work-related musculoskeletal problems.

Materials and methods

Starting August 2017, a cross-sectional study of 4090 Syrian refugee working children between 8 and 18 years was carried out in 153 randomly selected informal tented settlements (ITS) in the Bekaa valley. Female homemakers were also interviewed in each household. To identify households with working children, a community gate keeper known as the 'Shaweesh', helped identify households with working children. The Shaweesh is a member of the Syrian refugee community, who is well-connected, and regularly acts as a mediator between the community and outsiders.

Fieldworkers conducting the interviews consisted of 33 males and females who were recruited and trained before visiting ITS. For additional information on the study methodology, see Habib (2019) and Habib et al. (2019, 2020b, 2020c).

Ethical considerations

Oral informed consent was sought by data collectors from the female homemaker, and assent was sought from the working children. The participants were given an explanation about the purpose of the study, the confidentiality, and anonymity of the data collected, and the assurance that refusal to participate would not adversely affect their relationships with different institutions, including humanitarian, academic, or governmental. There was no financial compensation given to any of the study participants.

This study was approved by the Institutional Review Board (IRB) at the American University of Beirut (IRB Protocol Number: FHS.RH1.08). The ethical review process was vigorous and lengthy as participants were minor refugees in sensitive political and security contexts. Guidelines for reporting all forms of abuse among participants, following the respective Lebanese laws for refugee protection, and establishing a follow-up process in case of reported abuse by the participants, were also adapted into the research plan (Habib 2019). The sensitivities resulting from the power imbalance between the Lebanese host community and the refugees were mitigated by employing Syrian refugees in the data collection team (Habib 2019).

Measures

The indicators in this study included children's demographic and work characteristics. Work pressure among working children was assessed through 4 items: work despite severe pain due to fear of losing the job (yes/no), work under pressure to finish the job on time (yes/no), physically abused at work (yes/no), and relationship with co-workers (good/poor). The term 'physically abused' has been used to indicate

whether the child has been hit at work. Musculoskeletal disorders were assessed through self-reports of pain in the following body parts: wrist or hand, feet, back, neck, shoulders, elbow, knee, and other joints.

Statistical analysis

At the univariate level, frequencies and percentages were generated for categorical variables and means and standard deviations for continuous variables (Tables 1 and 2). Bivariate (unadjusted) and multivariable (adjusted) logistic regressions were used to test for the association between the outcome (reporting musculoskeletal pain) and factors including age, duration of work, work despite severe pain due to fear of losing the job, work under pressure to finish the job on time, physically abused at work, and relationship with co-workers. Two logistic regression models were performed, one for males and one for females, to uncover the gender differences in the tested associations (see Table 3 for males and Table 4 for females). The analysis was performed using Stata V.15.0 and the statistical significance was set at 0.05.

Table 1. Sociodemographic characteristics of working Syrian refugee children (8–18 years) in the Bekaa Valley, Lebanon, 2017 ($N = 4090$).

	Total		Male		Female	
Total, *N*	4090		2107		1983	
Characteristics	Mean	*SD*	Mean	*SD*	Mean	*SD*
Age, years	13.2	2.7	13.1	2.7	13.4	2.7
Age started working, years	11.2	2.6	11.1	2.6	11.4	2.6
Duration of work, years	1.5	1.4	1.5	1.3	1.6	1.4
Average work hours/day	6.7	3	6.9	3.3	6.5	2.6
	N	%	*N*	%	*N*	%
Field of work[a]						
Agriculture	3098	75.8	1396	66.3	1702	85.8
Waste picking	173	4.2	121	5.7	52	2.6
Construction	147	3.6	147	7	0	0
Car wash	100	2.4	97	4.6	3	0.2
Street services	98	2.4	62	2.9	36	1.8
Factory workers	87	2.1	51	2.4	36	1.8
Mechanics	78	1.9	78	3.7	0	0
Craft and related trade work	167	4.1	60	2.9	107	5.4
Vending and delivery	168	4.1	123	5.8	45	2.3
Other miscellaneous jobs[b]	382	9.3	222	10.5	160	8.07

[a]Total >100% as more than one option is possible.
[b]Denotes various jobs based on availability.

Results

The study sample included 4090 working children with similar proportions of males and females (males: $N = 2107$, 51.5% and females: $N = 1983$, 48.5%) (Table 1). The mean (SD) age of participants is 13.2 (2.7) where the youngest is 8 and the eldest is 18 years old. The average age of starting work is 11.2 (2.6) years. The children reported working for 1.5 years on average ($SD = 1.4$) and for 6.7 h per day ($SD = 3$).

The results on the field of work showed that more females worked in the agricultural sector compared to males (1702 *vs.* 1396) with the latter being reported as the field of work by the majority of the children ($N = 3098$, 75.8%). Children also worked in waste picking ($N = 173$, 4.2%), construction ($N = 147$, 3.6%), car washing ($N = 100$, 2.4%), street services ($N = 98$, 2.4%), factories ($N = 87$, 2.1%), mechanic shops ($N = 78$, 1.9%), among other occupations ($N = 382$, 9.3%) (Table 1). These sectors employed more male than female children.

Work environment and musculoskeletal pain

Of the children who reported musculoskeletal pain ($N = 179$, 4.4%), 53.1% ($N = 95$) were males. The survey found that 27.4% ($N = 49$) of the children with musculoskeletal pain reported working despite severe pain due to fear of losing their job; out of those, 27 were males and 22 were females (Table 2).

Three-quarters of the children ($N = 136$) with musculoskeletal pain reported working under pressure to finish their job on time with an almost equal number of males and females ($N = 69$ for males *vs.* $N = 67$ for females).

Table 2. Musculoskeletal pain and work under pressure among Syrian refugee children (8–18 years) in the Bekaa Valley, Lebanon, 2017 ($N = 4090$).

Children with musculoskeletal pain % (*N*)	Total ($N = 179$, % = 4.38)	Males ($N = 95$, % = 53.07)	Females ($N = 84$, % = 46.93)
Work despite severe pain due to fear of losing job			
No	72.6 (130)	71.6 (68)	73.8 (62)
Yes	27.4 (49)	28.4 (27)	26.2 (22)
Work under pressure to finish job on time			
No	24.0 (43)	27.4 (26)	20.2 (17)
Yes	75.9 (136)	72.6 (69)	79.8 (67)
Physically abused at work			
No	62.6 (112)	54.7 (52)	71.4 (60)
Yes	37.4 (67)	45.3 (43)	28.6 (24)
Relationship with co-workers			
Good	95.8 (159)	94.4 (85)	97.4 (74)
Poor	4.2 (7)	5.5 (5)	2.6 (2)

Table 3. Association between work under pressure and reporting musculoskeletal pain for male working Syrian refugee children (8–18 years) in the Bekaa Valley, Lebanon, 2017 ($N = 2107$).

Males with musculoskeletal pain ($N = 95$, % = 4.51)	Unadjusted OR (95% CI)	*p*-Value	Adjusted OR (95% CI)	*p*-Value
Age, years	1.03 (0.96–1.12)	0.39	1.02 (0.93–1.12)	0.68
Duration of work, years	1.16 (1.01–1.34)	0.03*	1.18 (1.01–1.38)	0.037*
Work despite severe pain due to fear of losing job				
No	1		1	
Yes	2.39 (1.49–3.83)	<0.001***	1.74 (1.05–2.88)	0.032*
Work under pressure to finish job on time				
No	1		1	
Yes	2.34 (1.41–3.88)	0.001**	1.59 (0.93–2.73)	0.091
Physically abused at work				
No	1		1	
Yes	3.59 (2.28–5.64)	<0.001***	3.01 (1.85–4.92)	<0.001***
Relationship with co-workers				
Good	1		1	
Poor	4.58 (1.77–11.87)	0.002**	3.80 (1.59–9.08)	0.003**

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; model clustered at household level.

Table 4. Association between work under pressure and reporting musculoskeletal pain for female working Syrian refugee children (8–18 years) in the Bekaa Valley, Lebanon, 2017 ($N = 1983$).

Females with musculoskeletal pain ($N = 84$, % = 4.24)	Unadjusted OR (95% CI)	*p*-Value	Adjusted OR (95% CI)	*p*-Value
Age, years	0.99 (0.92–1.07)	0.82	1.01 (0.93–1.10)	0.81
Duration of work, years	0.97 (0.81–1.16)	0.73	0.99 (0.84–1.18)	0.97
Work despite severe pain due to fear of losing job				
No	1		1	
Yes	1.89 (1.15–3.12)	0.01*	1.54 (0.90–2.63)	0.113
Work under pressure to finish job on time				
No	1		1	
Yes	3.05 (1.75–5.30)	<0.001***	2.83 (1.50–5.33)	0.001**
Physically abused at work				
No	1		1	
Yes	3.23 (1.85–5.67)	<0.001***	2.38 (1.31–4.31)	0.004**
Relationship with co-workers				
Good	1		1	
Poor	3.28 (0.71–15.15)	0.128	2.34 (0.55–10.02)	0.251

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; model clustered at household level.

More than one-third ($N = 67$; 37.4%) of the children with musculoskeletal pain reported being physically abused at work; with males counting almost two times more than females ($N = 43$ for males *vs.* $N = 24$ for females). The majority of children, 95.8% ($N = 159$), reported having a good relationship with their co-workers; the same trend applies when stratifying by gender.

Tables 3 and 4 present the logistic regression models for males and females separately. The trends of the associations between the study factors and reporting musculoskeletal pain were generally similar for males and females.

Children who worked despite severe pain due to fear of losing their job showed a higher odds of reporting musculoskeletal pain compared to those who did not in both males and females; this finding was only significant in males (for males: AOR, 1.74; CI, 1.05–2.88; $p = 0.032$; for females: AOR, 1.54; CI, 0.90–2.63, $p = 0.113$). A similar trend was identified for the association between reporting musculoskeletal pain and the children's relationship with their co-workers: a poor relationship with co-workers was associated with higher odds of reporting musculoskeletal pain. This result was statistically significant for males (AOR, 3.8; CI, 1.59–9.08; $p = 0.003$) but not for females (AOR, 2.34; CI, 0.55–10.02; $p = 0.251$). On the other hand, female children who reported working under pressure to finish their job on time had significantly higher odds of reporting musculoskeletal pain compared to those who did not work under pressure (AOR, 2.83; CI, 1.5–5.33; $p = 0.001$). A similar result was identified for males, although it was not statistically significant (AOR, 1.59, CI, 0.93–2.73, $p = 0.091$). Both boys and girls who were physically abused at work showed significantly higher odds of reporting musculoskeletal pain (for males: AOR 3.01; CI, 1.85–4.92; $p < 0.001$ and for females: AOR, 2.38; CI, 1.31–4.31; $p = 0.004$). The results also showed that the odds of reporting musculoskeletal pain increased with every additional year of work in males (AOR 1.18; CI, 1.01–1.38; $p = 0.037$), but not in females (AOR, 0.99; CI, 0.84–1.18; $p = 0.97$).

Discussion

This study on child labour, one of the largest globally to acquire direct testimony from working refugee children on their work experiences, illustrates the context

of precarity for Syrian refugees living in Lebanon. It shows that a large proportion of children started working at a young age, and spent long hours at work to make a living. The majority, more females than males, were employed in the agricultural sector, while other sectors including construction, waste picking, vending, and delivery were male-dominated.

This gendered division of labour is influenced by culturally specific understandings of gender roles (Galdo, Dammert, and Abebaw 2021). It is also influenced by the perceived value and nature of gender differences in characteristics and competencies (Mills 2016; Ridgeway 2001). Accordingly, more girls handpick crops than boys in agriculture, for example (Habib et al. 2020a). Employers may consider handpicking a task expected of girls, while tasks that require traits, such as physical strength, which are typically considered masculine, would be expected of boys. Previous analysis on this study population found that girls were more likely to engage in the double burden of work both inside and outside their households (Habib et al. 2020a). These findings were consistent with traditional gender norms and literature on the topic. Understandings of gender roles often determine the allocation of labour time across economic activities among men and women (Galdo, Dammert, and Abebaw 2021).

This analysis explored how exposure to psychosocial constraints is associated with the increased likelihood of Syrian refugee children workers to report musculoskeletal pain. In line with the published literature on risk factors associated with the musculoskeletal disorder, Syrian refugee children who have experienced psychosocial adversities at work showed a higher risk of reporting musculoskeletal problems (Kumaraveloo and Lunner Kolstrup 2018). Syrian refugee children are exposed to harsh working conditions, experiencing marginalisation, high stress, physical duress, and hazardous exposures. For instance, the fast-paced nature of agricultural work and the fact that their salary is based on finishing several tasks per day increase the psychological distress of children, causing them to work despite severe pain, under strained time-pressure in unhealthy environments (Habib et al. 2020c). Defined as the 'perception of threat, with resulting discomfort, emotional tension, and difficulty in adjustment', psychosocial stress may be experienced differently in workers (Buscemi et al. 2017). Migrant workers and refugees are often fearful of losing their jobs due to their precarious living conditions and legal status. Studies have shown that employees in anticipation of job loss, or who feel job insecure, are at risk of experiencing musculoskeletal pain as they strain themselves to continue working despite severe pain, under the pressure of time. Refugee populations have an increased risk of musculoskeletal disorder as a result of the hardships they endure. Despite this, they are less likely to report musculoskeletal pain 'from fear of employer reprisal, income loss or even deportation' (Senthanar 2018). Thus, the study shows similar challenges faced by children who also feel threatened by the precarity of their sociolegal status in host states; hence, increasing the psychosocial stress they experience. Moreover, the children's fear of reprisal by their employers indicates they may feel responsible for the families they are supporting. Efforts to complete tasks or continue working despite adversities and pain thus increase.

The literature also shows an association between physical abuse and musculoskeletal pain (Miranda et al. 2011; Miranda, Punnett, and Gore 2014). A study showed that workers who were physically abused reported musculoskeletal pain up to 2.5 times more frequently than those who were not (Miranda, Punnett, and Gore 2014). Similarly, our findings showed that children who reported physical abuse were more likely to also report musculoskeletal pain. In informal sectors of work, the effectiveness of government regulations on the working conditions that children are exposed to is reduced, leaving refugee children more vulnerable to experiencing violence at work (ILO and UNICEF 2020).

In addition, studies have also shown that social support—a worker's relationship with their co-workers—is associated with musculoskeletal pain (Baek et al. 2018). That is, the lack of availability of social support is positively associated with musculoskeletal pain, as psychosocial adversity (Woods 2005). Our findings showed that children who experienced poor relationships with their co-workers, an indicator of psychosocial stress, were more likely to report musculoskeletal pain. Literature has shown that social support is important for the protection of workers in the workplace; social support and in particular supervisor support is beneficial to reducing the effects of workplace bullying on the health and safety of workers (Nielsen et al. 2020). Additionally, research showed that women benefit more from the social support of colleagues compared to men (Nielsen et al. 2020); however further research is required to determine whether this would apply for working children as well.

Among the children interviewed, boys and girls showed similar patterns of associations between reporting musculoskeletal pain and psychosocial risk factors, including working despite severe pain,

working under time pressure, and being physically abused at work. Notably, boys reported higher proportions of being physically abused at work, likely as a result of cultural norms in which boys are more vulnerable to experiencing physical abuse (UN Women 2017). In addition, both boys and girls with poor relationships with their co-workers were more likely to report musculoskeletal pain. Social support from both colleagues and supervisors is thus essential to the reduction of the negative impacts of musculoskeletal disorders. In addition, the absence of social support and the presence of bullying aggravate the mental and physical health of workers (Nielsen et al. 2020).

The study findings shed light on a stark reality: the current working conditions of refugee children are expected to worsen as a result of the precarious living conditions in Lebanon. Declining economic and social circumstances in Lebanon continue to aggravate the livelihoods of Syrian refugee populations, forcing more refugee children into labour and at risk of hazardous working conditions and exploitation (Habib et al. 2021). With the local economy at a standstill, the increase of prices of basic goods, and high unemployment, vulnerable communities are struggling to meet their basic needs (Abouzeid et al. 2021; Habib et al. 2021). As a result, more refugee children are being forced into the labour market and out of schooling. The negative consequences of hazardous work that threaten the children's well-being must be addressed. Children must be moved out of harm's way and given the opportunity to grow and develop in healthy settings.

Consequently, priority should be given to child protection initiatives and measures that mitigate the deprivation of Syrian refugee children and prevent musculoskeletal pain. These measures would include providing compensation to families to ensure their children's enrolment and participation in school. A social security system supported to combat poverty could offer social protection to families who have been forced to partake in child labour. The institutionalisation and provision of funds to development projects to provide educational programs and sponsor training needed by children would be essential. These initiatives, among others, could strengthen local structures and aid in combatting poverty thus contributing to the social and legal protection of children and the eradication of child labour. To best protect children, it is important to pay attention to the psychosocial stressors they experience and account for the different exposures of boys and girls.

These child protection initiatives typically focus on children below the minimum national working age (usually below 15 years old, based on various national laws) (ILO 2021). It is therefore essential to establish interventions for safe work for children above the minimum national working age (15 years old and above) (ILO 2021). In doing so, ergonomic interventions aiming to alleviate musculoskeletal problems in the workplace should not only account for physical exposures but also address psychosocial adversities faced by children at work.

Special protections under child labour standards and the prohibition of hazardous working conditions must be enforced as young workers under the age of 18 are considered vulnerable groups (ILO 2018). Occupational injury rates are higher amongst young workers than adult workers and the consequences of occupational injury are often more serious when they occur at the beginning of a young person's working life (ILO 2018). Impairments in young workers could threaten the use of their education and training as active members of society (ILO 2018).

The main limitation of the study is its cross-sectional design preventing causal inferences. More so, it relies on self-reported exposure and outcome measures which could have made the study prone to bias. This may have been countered as children were interviewed in their homes, providing reassurance and willingness to listen so that they may share their work experience. The sample of the survey is representative of the most vulnerable population of the Syrian refugees in Lebanon and is therefore limited in generalisability. In addition, the gender-sensitive analysis adopted in this study did not distinguish between the concepts of sex and gender to account for the biological (physiological and physical) differences between male and female children (defined as 'sex'), and the dimensions of social identity (defined as 'gender') (Wizemann and Pardue 2001). However, in occupational studies, the physical and social parameters of exposures are closely connected and not easily distinguished (Wizemann and Pardue 2001).

Conclusion

While psychosocial risk factors of musculoskeletal pain in migrant adult workers have been extensively addressed in the literature (Hargreaves et al. 2019; Syed and Ahmad 2016; Yang et al. 2019; Graveling, Smith, and Hanson 2021), this study further contributes to illustrate how these risk factors manifest among refugee children, in a humanitarian setting. It also provides a gendered analysis that focuses on the adversities posed by child labour; and is the first to

obtain direct testimony on psychosocial risk factors and musculoskeletal pain, among male and female Syrian refugee children in Lebanon. In addition, the study documents the hardships experienced by children, from their perspective, establishing a worker-based standpoint (Messing 2016).

In conclusion, the harsh working conditions and socioeconomic pressure experienced by Syrian refugee child workers in Lebanon can be associated with an increased reporting of musculoskeletal pain in these children. Further research could help delve into other risk factors associated with musculoskeletal pain, while also recognising the multidimensional interactions of psychosocial adversities, sex/gender, and socioeconomic factors.

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The authors have declared that no competing interests exist.

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Data availability statement

Due to ethical issues surrounding this highly vulnerable study population living in a sensitive context (children and perhaps parents working with a nondocumented status, which may incur hostility), exposing their data is a potential risk to their safety and well-being. Consequently, the data from the study cannot be made public.

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