

Development and mixed-methods evaluation of Nour's World, a blended intervention for conflict-exposed children aged 5-8 years

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Research Article

Keywords: mental health and psychosocial support (MHPSS), conflict-exposed children, refugee, early childhood intervention, young children, trauma, parenting, mental health

Posted Date: September 8th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10764501/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Nearly 20% of children worldwide live in conflict zones, affecting their development and well-being. Lebanon hosts high numbers of refugees and sees recurring episodes of conflict and hardship, contributing to mental health problems among children. Early intervention is crucial to prevent further harm, yet young children are often overlooked. This study aimed to develop and evaluate Nour's World, a blended school-based mental health and psychosocial support (MHPSS) intervention for children aged 5 to 8, and their parents, exposed to war and conflict, in Lebanon.

Methods

The intervention was developed using participative action research. Effective core elements of an existing intervention were incorporated, culturally adapted, and digitalized. The intervention was evaluated using a mixed-methods design with pre-post-questionnaires (including parental competences and Arabic parent version of the Strengths and Difficulties Questionnaire (SDQ)), teacher-reported child mood, interviews with teachers, focus group discussions with children and parents, and systematic observations by fieldworkers. Qualitative data were coded thematically and analyzed inductively; Wilcoxon Signed Ranks Tests, paired t-tests and independent t-tests were applied to test significance of quantitative results and linear regression analysis was performed with sub-groups.

Results

The intervention was implemented in five schools (N = 305 children) in remote and refugee settings in Lebanon and was well received by children, parents, and teachers. Significant improvements ($p < 0.05$) were observed in children's SDQ total difficulties score, three SDQ subscales (conduct problems, hyperactivity/inattention, and prosocial behavior) and, general mood. Three of four assessed parental competencies improved significantly. Qualitative findings supported these results, indicating improvements in children's mood and behavior, and transfer of learned skills to other situations in school and at home. Teachers were able to deliver the intervention without specific training.

Conclusions

Both quantitative and qualitative findings suggest that Nour's World can improve psychosocial well-being and general mood in children, and parenting competencies in parents, in conflict-affected regions. The intervention is promising for upscaling in Lebanon and other Arabic-speaking conflict-affected settings. Further research with a controlled design is recommended.

1. Introduction

Nearly 20% of children worldwide are estimated to live in conflict zones [1]. Lebanon, amid a conflict region, hosts most refugees per capita and area; and half of them are minors [2]. In addition, the country has seen episodes of threat and conflict since the civil war in the 1970s with a total financial collapse and failing of state foundations in the past decade, the port explosion in 2020, and the recent Israeli attacks.

Growing up in such circumstances has profound and far-reaching consequences for child development and well-being. Children may experience the direct impacts of war and conflict such as fear, loss, pain, hardship, displacement, and disruption of formal education and of psychosocial services [3]. In addition, children may experience indirect trauma through the stress and trauma-related mental health issues of their parents or caregivers (hereafter 'parents'). Parents who are traumatized themselves, and suffer from PTSD (Post-Traumatic Stress Disorder), depression, or anxiety are less able to support their children's emotional needs [4]. Parental exposure to war is linked to harsher parenting and lack of warmth towards children [5–7]. This may result in problematic parent-child attachment and ultimately abuse and neglect [8]. Children in conflict zones are at high risk of developing mental health issues such as depression, anxiety, or PTSD [9–10]. In 2018, almost one third of youth under 18 years in Lebanon suffered from mental health and behavioral issues [11] and 11.5% experienced suicidal ideation [12]. After the port explosion, 64% of children screened positive for anxiety, 33% for depression, and 52% for PTSD [13].

Research shows that early intervention for potentially traumatized children (and their parents) is effective and essential to prevent (further) harm to mental health [14–15]. Young children, however, are often overlooked for intervention as they do not show typical adult symptoms of depression, anxiety, or PTSD [16–17]. Internalizing problems often remain unnoticed because they do not cause disruption in social settings [18] and for externalizing behavior, the link with adverse experiences or trauma is often not recognized [19]. Symptoms in children at risk may show as a loss of interest in play, failure to thrive, and behavioral changes such as hyperarousal, aggression, bedwetting, and developmental delays [20–21]. According to Maalouf et al. [11], for only 5% of children and adolescents suffering mental health issues in Lebanon, professional help is sought. In addition, psychologists and trauma specialists for both children and parents are scarce. There is a high need for low threshold mental health and psychosocial support (MHPSS) interventions for young children and their parents.

To address the needs of young children at risk of trauma-related mental health issues, and their parents in deprived areas and refugee camps in Lebanon, we aimed to develop and evaluate a school-based MHPSS intervention for children aged 5 to 8 years.

2. Methods

2.1 Development of the intervention

For the development of the intervention, participative action research [22] was applied. The goals, theoretical framework, and core working principles of the MHPSS intervention 'Build your Own Buddy' (BoB), in use in several sub-Saharan regions and created by the first two authors in collaboration with an NGO [23], formed the starting point. In line with Thaki's core focus¹, the intervention needed to be blended (in-person and digital) and self-guided.

2.2 Evaluation of the intervention

The intervention was evaluated by a mixed method design, using quantitative and qualitative methods, and took place in Lebanon from April to October 2023.

2.2.1 Measurement instruments

For the primary outcomes in children, the Arabic online parent 4–17 version of the Strengths and Difficulties Questionnaire [24] was administered as pre- and post-measure. The SDQ consists of 25 items, loading five subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer-relationships problems, and prosocial behavior. Response on a 3-point Likert scale are rated 0, 1 or 2. The total difficulties score is the sum-score of subscales, excluding the prosocial behavior score, and ranges from 0 to 40; at 13 is the cut-off point, below is 'normal'; above increases to 'borderline' and 'abnormal' difficulties scores. Subscale scores each range from 0 to 10. Low scores indicate strengths, high scores difficulties. For the subscale prosocial behavior this is the reverse [24]. In addition to the SDQ, demographic variables, and secondary outcomes were measured for parents, at pre- and post-measure: parental competences (four constructed questions with 3-point Likert scale response) and appraisal of the Nour application on parents' smartphones (only post-measure).

Teachers assessed children's overall mood in the preceding week, before and after the full intervention, with a 3-point smiley scale (*sad, ok, happy*). Focus group discussions were held with children and parents (separately), and with teachers. Systematic observations were done during field visits by Thaki workers. Questionnaires for parents were mostly filled in online by using a GDPR-compliant online questionnaire platform; for parents with limited literacy, the questionnaires were administered orally by Thaki field workers.

2.2.2. Analyses

Qualitative data were coded thematically and analyzed inductively, assisted by software (ATLAS.ti). Descriptive statistics were generated. SDQ items were scored in accordance with the instruction manual [25]. For parental competences, descriptive statistics were provided for differences in pre- and post-measures, categorized in improvement (> 0), no change ($= 0$), decline (< 0). Wilcoxon Signed Ranks Tests were applied to the differences between pre- and post-measures of parental competences and paired t-tests for SDQ outcomes. Independent t-tests were applied to determine the significance of change over time for subgroups (sex and age groups 5–8 and 9–12 years) within the SDQ-outcomes. Linear regression analysis was performed with post-measure SDQ total difficulties scores as outcome, and pre-measure SDQ total difficulties scores and sex as independent variables, to determine influence of sex on

SDQ total difficulties score. For analyses, only full sets of pre- and post-measure questionnaires were included. Two-sided p-values < 0.05 were considered statistically significant. The quantitative data were analyzed with SPSS version 28.

2.2.3 Power

A cohort (paired) within-subject design was used to test whether the paired mean difference would be different from 0. The comparison was made using a two-sided, paired-difference t-test, with a Type I error rate of 0,05. The underlying standard deviation of the paired difference distribution was assumed to be 1. To detect a paired mean difference of 0.2 on the primary SDQ-outcome with 80% power, the number of required participants was 199. Anticipating a 35% dropout rate, 306 participants needed to be enrolled to obtain a final sample size of 199 participants.

2.2.4 Ethics

Procedures for data collection and data management were approved by the TNO Board for Ethics in Research with Humans (#2022-061) and a Joint Controller Agreement on data processing was made. Thaki field workers held an information session for parents on every school before the onset of the study. Parents received written and oral information and gave signed informed consent. Data were pseudonymized and reported anonymized.

3. Results

3.1 Development of Nour's World

3.1.1 Development process

The intervention was cocreated by the researchers/authors, native speakers with lived experience, Lebanese and Syrian workers and teachers from five schools in Lebanon. Five categories of adaptations to BoB were necessary to create an intervention fit for the target group: 1) translation to Arabic language and culture, including acceptability in both Muslim and Christian religions, 2) adaptation to a school environment and flexible embedding in a curriculum, addressing both refugee and host community children in deprived areas, 3) digitalization without losing the benefits of the in-person group, 4) create a self-guided format for teachers, eliminating the need for specialized training, 5) find an alternative for parental involvement due to the school setting (instead of the community-based approach used in BoB). No concessions were made to the goals, theoretical framework and working principles of the predecessor intervention BoB.

A first viable version was pretested and evaluated in two schools from November 2022 to February 2023 to assess feasibility and appreciation of the activities, and 'look and feel' of visuals. After this, the intervention was further adapted into the version 'Nour's World', fit for implementation and evaluation.

3.1.2 Description of the intervention

Nour's World is a blended MHPSS intervention in Modern Standard Arabic (Fusha), for children aged 5–8, at risk for developing mental health issues due to war, conflict, or hardship. Through the adventures of 'Nour the rabbit²' and metaphor of a volcano, children learn to 1.) recognize, 2.) communicate about, and 3.) regulate overwhelming feelings. For parents, the intervention also aims to 4.) support their child in developing these skills. Six physical and mental strategies help children manage their emotions. The intervention includes an app for teachers, parents, and children, accessible via smartphone or laptop. It offers in-person group activities (in the classroom and playground), as well as digital content for children individually or in small groups in school (in computer labs), and activities for parents to do with their child at home. The full intervention typically requires ten sessions in class and is self-guided through video instructions in the app. The Nour application is available on all Thaki laptops¹ distributed among schools, and through app stores. Once downloaded, it works offline.

The core elements of Nour's World are rooted in contemporary scientific insights derived from Present-Centered Therapy [26], Trauma Focused Cognitive Behavioral Therapy [27], Emotion Focused Therapy [28], story-telling and indirect learning [29], cognitive reappraisal [30] and practicing and experiencing skills [31–32]. Core elements are, as in BoB [23], and widely recognized in trauma-informed practice: a.) to create a sense of safety and positivity that facilitates practice of coping skills, targeting the alleviation of current symptoms [26]; b.) empower children and parents to enhance a sense of agency and control [33]; c) connect with peers and social network as a basis for healing [33]; d.) work on body-mind connectedness [32] and, e.) deliver psychoeducation for parents to enhance parenting skills [27], and for children to learn that their feelings, worries and problems are a normal consequence of the circumstances [34].

3.2 Evaluation: Quantitative Results

Five schools or education centers³ in Syrian and Palestinian refugee camps and in deprived host regions (urban Tripoli, rural Akkar, suburban Beirut, rural Zahle, and Chouf district), participated with one class/group per school (305 children in total). All schools completed the intervention, taking six weeks on average with frequencies varying from one to three times a week.

Completed pre- and post-measures were available for 214 parent-child dyads. Reasons for non-response included inability to travel to school (due to costs, time constraints, lack of transportation) or not possessing a smartphone. No parents opted their child out of participation in either the intervention or the evaluation. Questionnaires were mostly (70%) filled in by mothers. Participants were equally distributed among the five schools and among sex. Unintentionally, only half of the participating children fell into the target age group (5 to 8 years); others were 9 to 12 years of age. For 38 of the 214 children, the reported age was unreliable (e.g. a child was younger at post-measure than at pre-measure) for reasons unknown; 4 children were under 5 years.

Table 1
Sample features (in number of children)

Region	Participating children	Girls	Boys	Age 5-8 ^a	Age 9–12 ^a
Urban Tripoli	41	28	13	23	8
Akkar	52	20	32	19	14
Suburban Beirut	44	19	25	14	28
Zahle	41	20	21	22	15
Chouf district	36	18	18	23	6
Total	214	105	109	101	71
^a Ages were not always known or reliable					

3.2.1 Outcomes in parents

Three out of four items regarding parental competences improved significantly during the pilot implementation (Table 2): *I believe I can influence how my child feels; I know what the emotional needs of my child are; I have the skills to emotionally support my child*. Improvement was defined as at least one point increase on the 3-point Likert scale.

Table 2
Number and percentage of parents that improved, declined, or reported no change regarding their parental competences (N = 214)

	Difference between pre- and post-measure			
	Improvement (%)	No change (%)	Decline (%)	Significance
My child talks about his/her current feelings	57 (27)	111 (52)	46 (21)	n.s.
I believe I can influence how my child feels	73 (34)	109 (51)	32 (15)	Z=-3.904; p<.001
I know what the emotional needs of my child are	73 (34)	112 (52)	29 (14)	Z=-4.258; p<.001
I have the skills to emotionally support my child	66 (31)	118 (55)	30 (14)	Z=-3.572; p<.001

A majority (70%) of parents gave 5 out of 5 stars to the intervention that was delivered in class. Combined with the Nour application used at home, more than 90% of parents felt it helped their child to *recognize feelings, communicate about feelings, and to calm down or regulate feelings*. Three quarters of parents used the Nour application more than once at home, and 90% of these parents felt it had similar effects on themselves. More than 90% of parents that used the Nour application (for themselves, for

their child separately or in interaction) rated it with 4 or 5 stars out of 5, regarding content, navigation and in general.

3.2.2 Outcomes in children

Analyses of the SDQ questionnaires showed significant improvements in mean total difficulties score and three of five subscores: ‘conduct problems’, ‘hyperactivity/inattention’, and ‘prosocial behavior’ (Table 3.) ‘Emotional symptoms’ and ‘peer-related problems’ did not change significantly between pre- and post-measure.

Pre-measure SDQ total difficulties score had a significant effect on post-measure SDQ total difficulties score ($p < 0.001$), while sex did not have an additional effect ($p = 0.7$). Boys on average had a higher pre-measure SDQ total difficulties score (mean = 15.3, SD = 6.6) compared to girls (mean = 12.4, SD = 6.6). Therefore, the overall effect was higher in boys (mean change=-2.1, SD = 6.6) compared to girls (mean change=-0.2, SD = 6.2).

Table 3			
Mean SDQ scores and differences (subscales and total difficulties) at pre- and post-measure (N = 214).			
SDQ Scales	Pre-test	Post-test	Difference
	Mean (SD)	Mean (SD)	Mean (SD)
Emotional symptoms	3.71 (2.65)	3.53 (2.28)	0.18 (2.67)
Conduct problems	2.66 (1.96)	2.23 (1.71)	0.43 (2.13)**
Hyperactivity/inattention	4.47 (2.50)	4.00 (2.24)	0.47 (2.47)**
Peer-related problems	3.03 (1.88)	2.96 (1.49)	0.07 (2.03)
Prosocial behavior	7.79 (2.02)	8.21 (1.69)	-0.43 (2.11)**
Total difficulties score	13.86 (6.70)	12.72 (5.84)	1.15 (6.48)**
**p < 0.01			
NOTE: Range for subscales 1–10; for total difficulties score 0–40. A low score indicates strength; a high score indicates a difficulty; only for the subscale ‘prosocial behavior’ a high score indicates a strength.			

Table 4. shows that both the target age group (children 5 to 8 years) and the older children (9 to 12 years) significantly improved their SDQ total difficulties scores. However, a different pattern was noted: the younger children improved one subscale (‘emotional symptoms’), while the older group improved three subscales: ‘conduct problems’, ‘hyperactivity/inattention’, and ‘prosocial behavior’. At pre-measure the older children had more difficulties (on all relevant subscales) and lower prosocial behavior than the younger children.

Table 4

Mean SDQ scores and differences (sub-scales and total difficulties) at pre- and post-measure, in two age groups (5 to 8 years and 9 to 12 years).

	SDQ Scales	Pre-test	Post-test	Difference
		Mean (SD)	Mean (SD)	Mean (SD)
Children 5–8 yrs (n = 101)	Emotional symptoms	3.82 (2.50)	3.28 (2.10)	0.55 (2.50)*
	Conduct problems	2.49 (1.90)	2.29 (1.72)	0.20 (1.97)
	Hyperactivity/inattention	4.19 (2.60)	3.98 (2.23)	0.21 (2.46)
	Peer-related problems	2.90 (1.63)	2.77 (1.50)	0.13 (1.81)
	Prosocial behavior	8.03 (1.96)	8.27 (1.65)	-0.24 (1.85)
	Total difficulties score	13.40 (6.47)	12.32 (5.67)	1.08 (6.08)
Children 9–12 yrs (n = 71)	Emotional symptoms	4.01 (2.72)	3.94 (2.18)	0.07 (2.78)
	Conduct problems	3.10 (1.99)	2.23 (1.73)	0.87 (2.28)**
	Hyperactivity/inattention	5.13 (2.44)	4.32 (2.08)	0.80 (2.60)*
	Peer-related problems	3.44 (2.11)	3.11 (1.46)	0.32 (2.22)
	Prosocial behavior	7.93 (1.81)	8.35 (1.57)	-0.42 (2.03)
	Total difficulties score	15.68 (6.37)	13.61 (5.53)	2.07 (6.62)*
*p < 0.05; **p < 0.01				
NOTE: Range for subscales 1–10; for total difficulties score 0–40. A low score indicates strength; a high score indicates a difficulty; only for the subscale 'prosocial behavior' a high score indicates a strength.				
NOTE: Children with unreliable reported ages (n = 38) and children under 5 years (n = 4) were excluded from the analyses.				

Teachers' assessments of each child's general mood during the past week, before and after the intervention, were available for 305 children, including those whose parents did not complete the questionnaire. Figure 1. shows that significantly ($p < .001$) more children were registered as generally *happy* at post-measure (75%) than at pre-measure (44%); and fewer children were *sad* (1% at post-measure versus 14% at pre-measure).

Of the 305 children, 132 (43%) individuals improved their mood. 'Improvement' was defined as a positive difference between pre- and post-measure: from *sad* to *okay* (32), from *sad* to *happy* (9), and from *okay* to *happy* (91). Of the 168 children who remained at the same level (*sad* to *sad*, *okay* to *okay* and *happy* to *happy*), 128 had already scored *happy* at pre-measure, indicating a ceiling effect.

3.3 Evaluation: Qualitative Results

The qualitative findings were derived from:

- 5 focus group discussions with children (20 children total of all ages up to 12 years)
- 3 focus group discussions with parents (11 parents total)
- 5 interviews with teachers (9 teachers total)
- 16 field visits with systematic observations including all participating schools

Thirty-one records (transcripts of focus group discussions and observation forms) were entered into ATLAS.ti for coding and analysis. In the initial coding phase, 608 quotations (i.e., relevant segments of text) were coded across 36 topics. Subsequently, related topics identified across different data sources were grouped into nine overarching themes (described below). Quotations could be assigned multiple codes where relevant, enabling analysis across different thematic combinations. Data saturation was reached with ample similar quotations within each theme and when no new topics were found. Data were also analyzed by school to assess potential bias or skewness; no differences were found, and all five schools were represented equally. During observations and focus group discussions no distinction between age groups were made.

3.3.1 Appreciation of Nour's World

All respondents were positive about the intervention. Systematic observations underpinned this: children visibly enjoyed the activities, were eager to answer, and were engaged during activities (in class, computer lab and playground). Respondents mentioned for instance (translated from Arabic):

It made us feel happy. (child)

Some children know the adventures by heart. (observer)

I like how it is so close to the kids and how they imitate Nour in everything. (teacher)

It was like a story for me, I liked it. It's also about relaxation, and my son likes to talk about it (parent).

3.3.2 Goal attainment

After the intervention was completed, the emotion regulation strategies were well remembered by the children.

Once, Nour was with a bird in the forest. The bird encouraged him, and they walked together. (child)

He [Nour] teaches us to stand up like a tree. (child)

When I feel angry, I hug myself (child)

The students talked a lot about the volcano [one of the metaphors in the intervention]. (teacher)

Teachers reported transfer of the use of these strategies by children to other situations as well.

Especially when I'm explaining a lesson in another class. For example, if you're on top of a volcano, take a deep breath. (teacher)

Once I was angry at the students, and one of them came up to me and said, "You are at the top of the volcano, miss". (teacher)

... even with my children at home. (teacher)

3.3.3 Outcomes in children

Teachers and parents reported positive effects of the intervention on the children.

My son told me that it helps him to deal with others. (parent)

My daughter started to tell me, "Now you are happy, now you are sad ..." (parent)

My daughter started to sing and dance. She was not like this before. Even when she wakes up, she does so with energy. (parent)

First of all, they changed a lot in how they interacted with each other, their relationships. They used to bully each other with names, for example, but after each session, they started to change. They saw how we acted with each other, so they changed a lot. They started to love each other more at the end of the year, and they asked us if they could hug each other to say goodbye. (teacher)

One of the students was very shy ... she used to come and hug me when I was alone. After a short time, she started participating. They were like empty books, and I am filling them. (teacher)

No adverse effects from the intervention or 'red flags' in children's behavior were reported or observed.

3.3.4 Implementation

Teachers reported that the instructions were clear, the videos were very helpful, and the goals of the intervention and its activities were well understood. The Nour app was qualified as easy to navigate with the three different routes for teachers, parents and children separately.

Each one of us had their own preparation, but before the class, we would have a meeting to plan the program and decide who would start and who would take care of each activity. We supported each other, and it was an amazing and fruitful experience. (teacher)

Time constraint was an issue reported by some teachers.

Everything was done in the classroom; we didn't go to the playground to save time. (teacher)

The setting of the classroom was not always beneficial since the set-up is mostly traditional with children sitting at their desks in rows. This may have limited group activities and interaction among children.

3.3.5 Age appropriateness

Unexpectedly, the classes participating in the pilot also included children up to 12 years of age. Teachers indicated that the intervention was most appropriate for children between 4/5 and 7/8 years of age. No children, parents or teachers rated the intervention as difficult.

3.3.6 Language

The language level (Modern Standard Arabic/Fusha) proved appropriate and readily understood by children across all ages.

3.3.7 Creating your own ‘Nour buddy’

One of the activities at the beginning of the intervention is to make your own cuddly ‘Nour’ by using local free soft materials such as an old sock. This has several functions: it is soothing, the creation is empowering, shy children may talk through their ‘buddy’ Nour, and the buddy serves as a cue to remember the strategies throughout the day. This activity was done in only one school; in other schools teachers reported time constraints and appeared to underestimate the relevance of the activity (e.g. told the children they could do it at home).

... we didn't want to waste time creating the buddy. (teacher)

I brought a rabbit to the class, so I didn't need to create one. (teacher)

3.3.8 Parents' involvement

Involvement of parents was meant to be achieved through the Nour app. In families that had downloaded the app, it was used often, mostly by the participating children or with siblings. Watching Nour's adventures was most popular. However, in approximately half of the families the Nour app was not available or only used once or twice, or only used by children. Reasons reported by parents included time constraints, not owning a smartphone or knowing how to download the app, not being aware of the intervention at school (inattending the kick-off meeting at school).

3.3.9 Suggestions for change

Suggestions for change, mostly made by teachers, concerned the implementation of the intervention. Teachers suggested introducing the intervention from the beginning of the school year. Only minor changes in the instructions were suggested. Teachers, parents, and children asked to provide more sessions, stories and activities. Most suggestions for change were integrated in the final version of the intervention.

4. Discussion

In this project we developed and evaluated Nour's World, an Arabic low threshold school-based MHPSS intervention for children aged 5 to 8 years, at risk for mental health issues due to war and conflict exposure. The intervention is self-guided and blended, with in-person activities and an app with routes for teachers, parents and children; accessible (offline) via laptop or smartphone. The intervention was highly appreciated by children, teachers, and parents, and the self-guided approach of the intervention proved to work. Parental competences improved significantly, as did the general mood of the children. Children also significantly improved their SDQ scores on conduct problems, hyperactivity/inattention, and prosocial behavior, as well as their total difficulties score. Our findings are in line with Speelman et al. [35] who also reported positive effects of a trauma-informed emotion regulation intervention (Nour's World predecessor intervention BoB) on children's psychosocial functioning.

Unintentionally, older children (9 to 12 years) were also included in the sample, due to the organization of non-formal schools (e.g. in refugee areas), where classes are based on academic level, rather than biological or social-emotional developmental age. Classes therefore harbor children of different age groups. In practice, restricting participation to the target age group within a class would have been neither feasible nor ethically appropriate. Notably, improvements in psychosocial well-being (SDQ total difficulties score) were observed in both age groups. The larger improvement in the older age group may partly be explained by their lower baseline scores with greater room for improvement than the younger group. Possibly, the older group included children with a disharmonic developmental profile or special needs (other than lower academic grades). The influence of the group composition on the outcomes remains unclear. As the inclusion of older children was unintentional, no age-specific distinctions were made during observations or focus group discussions.

Boys showed on average higher pre-measure SDQ total difficulties scores than girls, reflecting greater initial psychosocial difficulties in boys. As higher pre-measure scores were associated with larger improvements, boys also showed greater reductions (improvements) in SDQ total difficulties scores over time. However, sex did not independently predict post-measure scores after adjustment for pre-measure scores, indicating that the impact of the intervention was comparable for boys and girls.

4.1 Strengths and limitations

A strength in this project is the application of action research and the involvement of teachers, parents, and native speakers with lived experience during development of the intervention. This enhanced the feasibility and cultural appropriateness of the intervention. It was also helpful with the implementation and with recruiting parents for the questionnaires. Another strength during intervention development was the meticulous application of the science-based core elements from Nour's World's predecessor intervention BoB [23]. Lastly, a strength is the mixed method design for evaluation, with both quantitative methods, the use of a validated measure (Arabic version SDQ), and qualitative evaluations to gain deeper insight.

The main limitation of this study concerns implementation, particularly the wider age range of children within participating classes than originally intended. As a result, the number of children within the intended target age group was smaller than planned. However, it also provided additional insights into the intervention's potential impact on older children.

Some teachers felt time constraint in fitting the intervention in their daily routine. Because of this, in four out of five participating schools, the cuddly Nour 'buddy' was not created, and some teachers did not move to the playground to do activities. Nevertheless, the quantitative and qualitative results, suggest that the core elements of the intervention were addressed in all participating schools, with indications of transfer of learned emotion regulation strategies to other situations in school and at home.

Finally, a limitation concerns the study design as the outcomes in children participating in the intervention were not compared with those in a control group. However, the triangulation of quantitative and qualitative data is a strength of this study. The convergence of findings from different data sources towards a positive impact, combined with the foundation of established science-based core elements, suggest promising effectiveness of the Nour's World intervention.

5. Conclusion

Nour's World was well received by children, parents and teachers, and showed positive and significant outcomes in children and parents, while no adverse effects of the intervention were observed. Teachers were able to deliver the intervention without specific training, due to its self-guided nature, the blended design and video-instructions. Guidance regarding the implementation process in school and how to involve parents, is however recommended.

Both boys and girls benefitted from the intervention and although it was designed for children aged 5 to 8 years, children up to 12 years and children with initial adequate psychosocial well-being, benefited, suggesting that prior selection based on age, sex, or initial psychosocial well-being is neither necessary nor recommended.

Given these promising results, the intervention Nour's World has potential for scale-up to additional schools and refugee centers across Lebanon and other Arabic-speaking regions. Its blended, self-guided approach, integration in educational settings, active involvement of both children and parents, and cultural adaptability [36] make it particularly suitable for contexts affected by conflict and displacement. While evidence on MHPSS-interventions for young children remains limited, Nour's World may represent a valuable first-phase support intervention [30, 37–38] following potentially traumatic experiences. When adapting the intervention to other cultures and circumstances and/or age-groups, applying the same core elements as in Nour's World, is essential.

Future research should focus on controlled studies, including follow-up post-measurements.

Abbreviations

BoB
Build your Own Buddy
MHPSS
Mental Health and PsychoSocial Support
NGO
Non-Governmental Organization
PTSD
Post-Traumatic Stress Disorder
SDQ
Strengths and Difficulties Questionnaire

Declarations

Competing interests:

The authors declare that they have no competing interests.

Ethics approval:

Procedures for data collection and data management were approved by the TNO Board for Ethics in Research with Humans (#2022-061).

Funding:

Nour's World was developed by TNO (Netherlands Organization for Innovation and Applied Scientific Research) and Thaki (NGO for digital learning), through a grant from the Netherlands Enterprise Agency, RVO (SB SB1DT20009).

Author Contribution

R.V. wrote the main manuscript and was leading scientist during the project while R.A. was overall project-manager. R.V. and J.S. created the intervention while Thaki personnel created the visuals and digital components. M.K., K.G. and R.K conducted and coordinated recruitment, fieldwork and data-collection in Lebanon. Statistics and qualitative analyses: J.S., PvD, and R.V. All authors reviewed the manuscript.

Acknowledgement

We thank the teachers of the participating schools for helping with data-collection.

Data Availability

The questionnaires, observation and focus group protocols that support the findings of this study are available from TNO, dept. of Child Health, but restrictions apply to the availability of data, and so are not publicly available. Data are, however, available upon request and with the permission of TNO.

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Footnotes

1. Thaki's core focus is to provide digital learning opportunities and educational resources to refugee and vulnerable children.
2. 'Nour' is both a boy's and girl's name and means 'light' in Arabic.
3. Included were: a public school, informal schools and community centers (often run by an NGO in refugee camp or deprived areas).

Figures

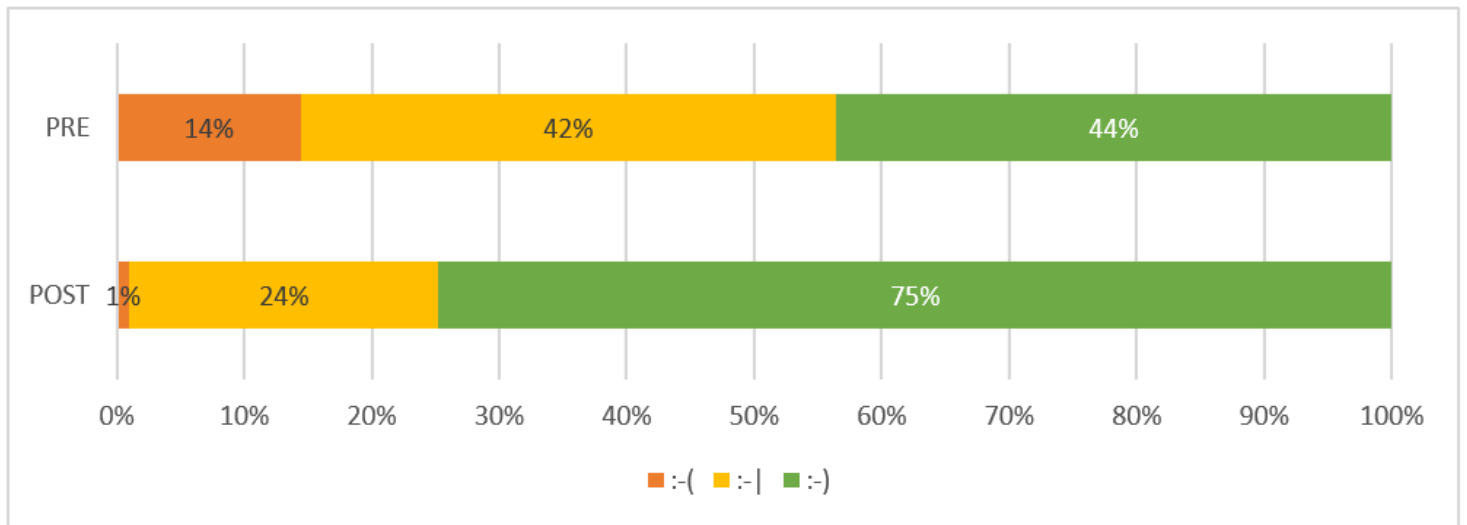


Figure 1

General mood of children in percentage 'sad', 'okay' and 'happy' during the past week, reported by teacher, at pre- and post-measure (N=305)