

### **Does group size and blending matter?**

#### **Impact of a digital mental health game implemented with refugees in various settings**

##### **Abstract**

**Background:** There is an urgent need to upscale accessible mental health interventions for adolescents. The Happy Helping Hand (HH) is a digital game developed to address the urgent need for innovative approaches to improve access to mental health tools for adolescents across digital divides, Syrian refugees included. How cognitive behavioral (CB) tools are implemented can affect the impact of the intervention.

**Objective:** Research is needed to evaluate impact when new mental health tools are implemented. The main aim was to examine the potential impact of the HH game when implemented in settings that varied regarding to group size and face-to-face (F2F) versus digital contact.

**Methods:** A mixed methods study was undertaken. The study took place in Central Beqaa, Lebanon from September 2020 to February 2021. In four different settings, nine groups of adolescents with a total of 125 Syrian displaced adolescents aged 13 – 17 years ( $M^{age}=13,6$  years) participated in a 10 session psychosocial program based on the HH game. The adolescents were recruited from an education center, two orphanages and one informal settlement where the participating adolescents had dropped out of school. Impact was evaluated using a validated wellbeing questionnaire, WHO 5 Wellbeing Index (WHO5), undertaken at baseline and directly after the end of the intervention.

**Results:** After the adolescents had played the HH game, significantly better wellbeing was reported in all settings. In total at baseline, 28% of the adolescents reported normal wellbeing, while 99% reported normal wellbeing after the HH program was implemented and the mean scores in wellbeing changed from indicating depression ( $M=59,4$ ) to normal wellbeing ( $M=77,3$ ), as reported on WHO5. Smaller groups with more F2F contact reported greater positive changes in mean wellbeing than bigger groups with less F2F contact. However, the greatest aggregate change in wellbeing was achieved when the HH game was implemented in bigger groups and digitally.

**Conclusions:** CB digital games represent an innovative and scalable approach for improving wellbeing, both for the individual Syrian refugee adolescent and for society. This study adds to the evidence of digital mental health tools making an impactful contribution to ensuring healthy lives and wellbeing for all.

**Keywords:** mental health; wellbeing; games; mobile applications; e-health; blended learning; implementation; CBT; cognitive behavioral; COVID-19; refugee; adolescent.

**Corresponding author:** Dr. Solfrid Raknes; [solraknes@gmail.com](mailto:solraknes@gmail.com)

The provision of psychosocial services (PSS) to adolescents is a central strategy to promote positive mental health, prevent mental health conditions, and prevent self-harm and other risk behaviors (WHO & UNICEF, 2021). There is a huge gap between the number of adolescents who could benefit from PSS, and the number who actually receive evidence based PSS everywhere, and even particularly so among adolescents in poverty and countries in economic crises (Colizzi, Lasalvia & Ruggeri, 2020). Costs of implementing PSS, typically driven by therapist-payment, is found to be the main reason for this gap. Hence, interventions that can be upscaled with little time used per therapist per child are of particular interest when the aim is to improve access to PSS for all (Bennett-Levy et al., 2010).

The ongoing Covid-19 pandemic is associated with both an increase in mental health problems for adolescents and poverty (Shen et al, 2020). Additionally in Lebanon, the ongoing economic crises, the aftermath of the explosion in the Port of Beirut in August 2020, and the impact of the more than ten years long war in neighbouring Syria, have together resulted in a great need for PSS for Syrian adolescents in Lebanon (World Bank, 2020).

PSS interventions can take many forms, including use of cutting edge technology to enhance learning. If mental health literacy can be gained from cutting edge technology and implemented at school in full classrooms, stigma-problems associated with the intervention and mental health problems might decrease (Smart A, Sinclair M,...& Williams, 2019). There is a vast literature on related subjects, some of which is summarized in two recent articles. Mendelson's (2018) meta-review of prevention of mental disorders in higher-income countries points out that the benefits of modest prevention in early life may cascade over the life course, and that even small preventative effects may be magnified in terms of population impact. A meta-analysis by Clark, Tanner-Smith & Killingsworth (2016) on digital games and learning indicates that games positively influence k-16 students in terms of cognitive, skill-based, and affective learning.

The HH game, is a cognitive behavioral digital game for adolescents created to be useful across economic divides (Raknes, 2020a). The HH is free to download in Arab as an app in Lebanon, and can be used on tablets and phones, both for Mac and Android. In the HH game, the adolescent helps a friend to master emotional challenges, such as fear of giving presentations, dealing with criticism, suicidal thoughts and bad memories. HH in its analogue version has been found to be highly effective in decreasing anxiety in a randomized and controlled study where the analogue version of the HH was used by adolescents in a school-based PSS program run by school health nurses in Norway (Haugland et al., 2020). The HH digital game can be used as pure self-help, in PSS provided individually or in groups, or as part of social and emotional learning at school. The way an intervention is implemented can affect the impact of the intervention (Fixen, Blase, Naoom & Duda, 2015). Group size, and whether the sessions are given F2F or digital, have been found to affect impact. Higher costs per intervention per child will typically be associated with smaller group sizes and F2F-teaching.

When innovative PSS interventions are developed and implemented in new contexts, they should be evaluated. The main aim was to examine potential impact and feasibility of the HH

game when used by Syrian adolescents and implemented in settings that varied regarding to face-to-face (F2F) versus digital contact and group size.

## **Methods**

### ***Recruited participants***

Participants were recruited in informal settlements for displaced Syrians. The adolescents with whom the HH was implemented in this study, have witnessed the cruelty of war and many have seen friends and families die. Now they are living as forced displaced Syrians in Central Beqaa, Lebanon. The psychologist who ran the groups was also a displaced Syrian. To decrease stigma associated with help seeking, a universal strategy was applied. All adolescents were invited to participate, without questioning their mental health or coping skills. Adolescents were recruited from four settings: 1) a private school, 2) two orphanages/education centers and 3) an informal refugee settlement.

### ***Implementation time and settings***

In this study the HH was implemented in four settings that varied with respect to group-size, and where the largest group received eight of ten sessions digitally, while the smaller groups received all sessions F2F. The study took place in the period from September 2020 to February 2021. In this period, the Covid-19 pandemic was ongoing. Various restrictions on F2F contact were implemented in Lebanon to prevent the spreading of the Covid-19 virus, and PSS work had to be flexible to reach out. Eight of the ten PSS sessions that were planned to be implemented in bigger classrooms became illegal to implement F2F due to Covid-19 restrictions. Hence, these sessions were implemented digitally, through Zoom. Orphanages and informal settlements could still legally run small groups F2F. Eventually we ran nine groups for a total of 125 Syrian adolescents aged 13 – 17 years ( $M^{\text{age}}=13,54$ ). All groups got 10 sessions of 45-60 minutes, and all took place over a period of ten weeks. The HH manual was used to structure the sessions (Raknes, 2020b).

### ***Quantitative and qualitative data***

Adolescents completed a questionnaire before and after the 10-session PSS program. Data was collected by the group leader by paper and pen or digitally. Wellbeing was measured by the WHO-five-wellbeing index (WHO5) (Topp, Østergaard, Søndergaard & Bech 2015). The WHO5 is a five-items questionnaire validated in Arabic. The raw score ranging from 0 to 25 is multiplied by 4 to give the final score from 0 representing the worst imaginable wellbeing to 100 representing the best imaginable wellbeing. A raw score below 13 and 0 or 1 in any of the five questions was used to indicate poor wellbeing. Written session-by-session reports were produced by the psychologist who was leading the groups. The qualitative data was used to interpret and validate the quantitative findings.

## **Results**

A total of 125 Syrian adolescents in Lebanon, spread across a total of four settings. Nine groups, participated in the study. As shown in Table 1, the percentage of adolescents who reported normal wellbeing increased significantly from before to after the program: 99,2% of adolescents enrolled in the program reported normal well-being at the end of the program, as compared to 28,0% at baseline, when measured by the WHO5. Significant change was reported from all four learning conditions, indicated by at least 10% change of

the mean WHO5 from pre to post intervention. The mean change from pre to post was 17,9% in total, varying from 14,8% in full classroom settings (School/dig); to 16,1% (Orphan1) and 23,3% (Orphan2) at the two orphanages/education centers to 26,2% in the informal settlements (Informal). The largest change in wellbeing was reported from the adolescents who got the HH program in smaller groups the informal settlements where they lived; the lowest change in wellbeing was reported from the adolescents who got the HH as part of their school package, as shown in Table 1.

#### Overview of changes in wellbeing at the four settings where the HH was implemented

Center	Number of youth/group	F	M	Pre % normal	Post % normal	Pre WBI (M)	Post WBI (M)	Diff
School/dig	43/2	26	17	39,5	97,7	62,9	77,7	+14,8*
Orphan1	51/3	29	22	25,4	100	60,6	76,7	+16,1*
Orphan2	11/2	7	4	18,2	100	64,0	87,3	+23,3*
Informal	20/2	8	12	15,0	100	47,0	73,2	+26,2*
All settings	125/9	70	55	28,0	99,2	59,4	77,3	+17,9*

*Table 1. Wellbeing, as reported by Syrian displaced adolescent (N=125) in nine groups at four settings in Beqaa, Lebanon, on the World Health Organization (five) wellbeing index (WHO5). Numbers are reported in percentage of all the adolescents (N=125), 70 girls (F) and 55 boys (M) who scored in the normal wellbeing zone pre and post intervention; mean WHO5-score, pre and post intervention; Difference (Diff) in mean WHO5 scores from pre to post the Happy Helping Hand intervention.*

Secondly, change in wellbeing was explored focusing on the main cost of PSS programs: The group facilitator(s) time. When a country, a region, a county, an NGO or a school has a limited number of psychologists/other trained health professionals to run evidence based PSS groups, and want as much health as possible to be produced from these professionals as possible, efficiency and productivity becomes central. To explore what settings created the biggest aggregate change in wellbeing per therapist-hour spent, the following calculation was applied:

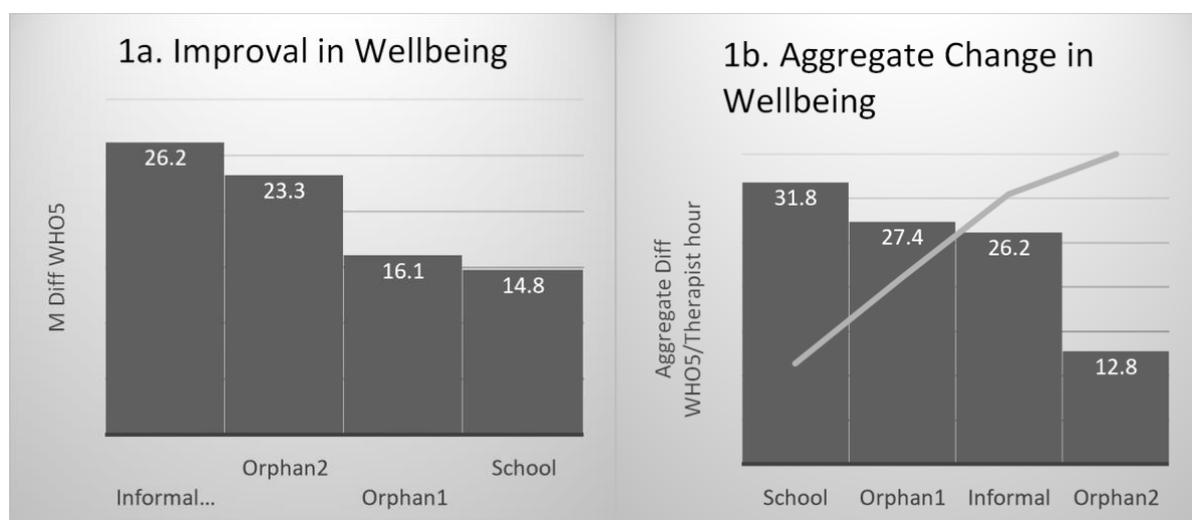
$$\text{Mean Change in Wellbeing} \times \text{Number of Adolescents in the Setting}$$


---


$$\text{Therapist Time in the Setting}$$

Mean change in wellbeing was calculated as the difference from pre to post on mean WHO5; therapist time in the setting was calculated as 10 hours per group, calculated by number of groups in the setting. Figure 1a shows the mean change in wellbeing per adolescent in four

different settings, visualizing that as a mean, adolescents who were not in any other education and had dropped out of school, and who received the HH in the informal settlement where they lived, reported the highest change in wellbeing. Adolescents in the orphanage/educational center where the adolescents received the HH in the smaller groups reported higher changes than the adolescents in the orphanage/educational center who received the HH in bigger groups. The adolescents who received the HH as a part of their school package in full classrooms, and received 8 of 10 sessions digitally, reported lowest changes in wellbeing. Figure 1b shows change in wellbeing focusing on the psychologist's time. The biggest change was found in the school setting; in full classrooms were eight of the sessions were digitally implemented, while smaller efficiency of the psychologist in creating change in wellbeing was found when working with smaller groups and F2F.



*Figure 1 a. Change in wellbeing in four implementation settings; i) School; ii) Orphan1; iii) Orphan2; and iii) Informal settlement. Change in wellbeing intervention is reported in mean difference score on the World Health Organization (five) wellbeing index (WHO5) from before to after HH.*

*Figure 1 b. Change in wellbeing from before to after HH intervention in four settings, as reported in aggregate change in wellbeing for all adolescents in the setting, divided on psychologist's time used in the setting.*

## Discussion

In this mixed method pilot study a new cognitive behavioral mental health game, HH, which targeted Arab adolescents was evaluated. The study was implemented with displaced Syrian adolescents in the autumn of 2020 and winter 2021, during the Covid-19 pandemic, a period of changing and challenging restrictions in social contact. A total of 125 Syrian adolescents in Lebanon used the HH to increase wellbeing. Our results indicate that the HH was beneficial across settings. After playing a digital mental health game, almost all participants reported normal wellbeing. Higher changes in wellbeing was associated with using the app in in groups for adolescents who had dropped out of school, and in smaller groups rather than bigger groups. However, if the psychologist's time was taken into account, greater changes in wellbeing were generated when the app was implemented in bigger groups, even when

eight of ten sessions were run digitally. The following discussion will center on these results and how to explain them.

Across implementation settings, the adolescents' wellbeing had increased after they had played the HH game. The percentage of adolescents in the normal range of wellbeing in the total sample (N=125) increased from 28% before to 99% after intervention. These numbers are almost too good to be true. The qualitative data support that the digital game was motivating and created enthusiasm among the participating adolescents and in the psychologist as well, and they found it helpful to share feelings and thoughts not expressed otherwise. The results from our study are promising, and encourages further exploration of the potential benefits of the HH mental health app on wellbeing and on preventing mental health disorders.

In the Arab culture, mental health problems are a taboo, and anti-stigma work is needed to address this issue (Dardas & Simmons, 2015). The impact of digital PSS has not been widely explored with Arab adolescents living in poverty. All participants in this study were Arabs. They commented that the digital game was an unusual and new way in which the participant could participate interactively and creatively, and they found that they learnt important skills in a way they enjoyed. Our results indicate that for Arab adolescents, CB digital games like this can be beneficial. If using the HH game reduces stigma in Arab families, schools and communities, and increases awareness of the value of mental health and help seeking, these are potential benefits of games like this across cultures.

Further, our results indicate that for displaced and traumatized adolescents living in poverty, a cognitive behavioral digital mental health app can improve wellbeing. However, digital divides as barriers for implementation and impact of the game were raised as a concern: *"Lacking electronic devices hindered use of the app between the session for some of the adolescents. The inability of some teenagers to read and write, also created difficulties when using the game. Some adolescents, especially males, were absent from some of the sessions, due to their commitment to work to meet basic needs at home,"* the psychologist who ran the groups explained. Clearly, for many of the least privileged children, more than a digital game is needed to improve wellbeing and create a solid foundation for development.

High quality low-cost interventions are crucial to increase access to mental health services for people in extreme poverty. When upscaling PSS interventions aiming to help as many as possible, both demonstrating a PSS intervention's impact on wellbeing, and use of psychologists, are important factors for scalability. The impact of the PSS intervention is important both for the adolescents involved, their families, teachers and the psychologist who is leading the group, and PSS programs with higher impact are preferred if they can be afforded. Importantly, the mean change for adolescents was higher when the HH game was implemented in smaller groups and F2F than in bigger groups with less F2F contact. However, the psychologist created highest aggregate change of wellbeing per hour when the HH was implemented in bigger groups where most of the sessions were given as digital group sessions by zoom, even if the group reported high frequent problems with electricity- and WIFI cuts. What is more important, higher impact for each and every participating adolescent, or more productive use of the psychologist, is a question with implications for

decision makers; politicians, health professionals, education professionals, parents and adolescents included.

### **Limitations**

Even if the results from this study are promising, there are several limitations associated with this study. A one-group, pro-post design does not lend itself to the drawing of causal conclusions. Other factors than the HH intervention, such as time, changes in the life situation associated with Covid-19 restrictions, and bias from the group facilitator who also collected the data, can explain the changes between the two measure points. Also, and importantly when generalizing from this study, participating in the PSS discussion group led by a psychologist, and not the game as such, could also have led to the increase in wellbeing. Furthermore, given the rather small sample sizes, generalizations should be drawn with caution. Further studies should explore whether the results will be replicated when the game is used in PSS groups led by other PSS professionals and teachers. If the adolescents' wellbeing increases when teachers are facilitating the game, upscaling through normal school systems would be easier. Further, studies should explore the same factors when the game is used as poor self-help, meaning without guidance from professionals. Also, to prepare studies of the HH as a self-help tool for adolescents in poverty in Lebanon, data should be collected digitally directly from the adolescents, and not by the group leader.

### **Conclusion**

Mental health problems occur frequently among adolescents across the world, and the Covid-19 pandemic makes access to digital mental health tools more relevant than ever before. The gap between adolescents who could benefit from PSS interventions, and adolescents who actually are participating in such interventions is huge, especially among traumatized adolescents in poverty (Patel et al, 2018). In this study a CB digital game was implemented with Syrian refugees living in poverty, during social restrictions in four different settings that varied regarding group size and F2F-contact with the group leading psychologist. The HH digital game was found feasible and useful in all settings. After participating in the HH intervention, the adolescents' wellbeing was transferred from below normal to normal in nearly all adolescents. Greater changes in wellbeing per adolescent were reported in settings where the adolescents did not attend other education, and in smaller groups where they used the HH game F2F. More productive use of the psychologist was found when the game was implemented in bigger groups and digitally. Our results indicate that the HH game can improve wellbeing and mental health for Syrian refugees. Importantly, the results build on the base of evidence on digital mental health interventions as promising tools and are in line with studies indicating that digital mental health tools can be helpful in reaching sustainability goal number 3: Ensure healthy lives and wellbeing for all.

### **References**

Bennett-Levy J, Richards DA,...Williams C (2010). *Oxford Guide to Low Intensity CBT Interventions*. New York: Oxford

Clark DB, Tanner-Smith EE, Killingsworth SS (2016). Digital Games, Design, and Learning: A Systematic Review and Meta-Analysis. *Review of Educational Research* March 2016, Vol. 86, No. 1, pp. 79–122

Colizzi M, Lasalvia A. & Ruggeri M. Prevention and early intervention in youth mental health: is it time for a multidisciplinary and trans-diagnostic model for care?. *International Journal of Mental Health Systems* 14, 23 (2020). <https://doi.org/10.1186/s13033-020-00356-9>

Dardas LA, & Simmons LA (2015). The stigma of mental illness in Arab families: a concept analysis. *Journal of Psychiatric and Mental Health Nursing*, 22, 668-679. doi: 10.1111/jpm.12237

Fixen DL, Blase K, Naoom S, & Duda M. (2015b). *Implementation Drivers: Assessing Best Practices*. Chapel Hill: National Implementation Research Network, University of North Carolina at Chapel Hill.

Haugland B, Håland Å, ...Wergeland G (2020). Effectiveness of brief and standard school-based cognitive behavioral interventions for adolescents with anxiety: A randomized non-inferiority study. *Journal of the American Academy of Child & Adolescent Psychiatry*. <https://doi.org/10.1016/j.jaac.2019.12.003>

Mendelson E (2018). Recent advances in the prevention of mental disorders. *Social Psychiatry and Psychiatric Epidemiology*, 53(4): 325-339.

Patel V et al. (2018). The Lancet Commission on global mental health and sustainable development. *The Lancet*, Volume 392, Issue 10157, 1553 – 1598

Raknes S (2020a). *The Happy Helping Hand*. Apple store and Google Play.

Raknes S (2020b). *The Happy Helping Hand. Teacher Manual*. <http://solfridraknes.no/ar/>

Shen K, Yang Y...& Wang Y. *Diagnosis, Treatment, And Prevention Of 2019 Novel Coronavirus Infection In Children: Experts' Consensus Statement*. World Journal of Pediatrics : WJP; 2020. Global Pediatric Pulmonology Alliance; pp. 1–9. PubMed.

Smart A, Sinclair M,...& Williams (2019). *NISSEM Global Briefs: Educating for the Social, the Emotional and the Sustainable*. <https://www.nissem.org/globalbriefs>

Topp CW, Østergaard SD, Søndergaard S, Bech P (2015). The WHO-5 Wellbeing Index: a systematic review of the literature. *Psychotherapy and Psychosomatics*. 84(3):167-76. doi: 10.1159/000376585.

WHO & UNICEF (2021). *Helping adolescents thrive toolkit: strategies to promote and protect adolescent mental health and reduce self-harm and other risk behaviours*. Geneva. Downloaded from <https://www.who.int/publications/i/item/9789240025554>

World Bank (2020). *The Mobility of Displaced Syrians: An Economic and Social Analysis*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1401-3.

### Disclosure

I, Dr. Solfrid Raknes, have the following commercial relationship to disclose: The Happy Helping Hand is a self-help material I have commercial interests in, in accordance with the standard sharing rules for innovation in the public and private health sector in Norway.

### Accreditation

Thanks to Innovation Norway for supporting development and proof-of-concepts studies of the HH. Thanks to Heimstadkjær i Midsund, Norway, for covering costs for implementing PSS to adolescents in Lebanon in this study.