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A feasibility study of Online Mellow Bumps: A Turkish pilot study of an online group-based antenatal parenting intervention

Alex Miles[a,*], Michael Lovell[b], Raquib Ibrahim[b], Tolga E. Dagli[c], Figen Sahin Dagli[d], Dr. Vaheshta Sethna[e]

[a] Institute of Psychiatry, Psychology and Neuroscience, King's College London, Strand, London WC2R 2LS, United Kingdom
[b] Mellow Parenting, Unit 4, Six Harmony Row, Glasgow G51 3BA, Scotland
[c] Department of Pediatric Surgery, Marmara University Faculty of Medicine, Istanbul, Turkey
[d] Department of Pediatrics, Gazi University Faculty of Medicine, Ankara, Turkey
[e] Department of Forensic and Neurodevelopmental Sciences, Institute of Psychiatry, Psychology and Neuroscience, King's College London, Strand, London WC2R 2LS, United Kingdom

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ABSTRACT

Background: As a result of the COVID-19 pandemic, Mellow Parenting proposed online strategies for some of their interventions. One such intervention was Mellow Bumps – becoming Online Mellow Bumps. The objective of this study was to evaluate the implementation of antenatal parenting intervention Mellow Bumps in an online format and determine if this can be done safely and without detriment to pregnant women in Turkey.

Method: The study used an exploratory study design to investigate routine evaluation data collected pre- and post-intervention. Outcomes were online feasibility, mental health symptoms (depression, anxiety and stress), maternal subjective well-being, perceived quality of relationship with baby, maternal confidence and maternal social connectivity. 128 mums-to-be took part in the intervention between January 2021 and May 2021 from a total of 21 different provinces in Turkey.

Results: 57 pre- and post-intervention responses were eligible for analysis. This gives a response rate of 44.5% for evaluation, though the intervention completion rate was high at 89.5%, suggesting the intervention is engaging and accessible. Improvements were found for maternal stress levels, maternal subjective well-being and perceived relationship with baby. Improvements were also found for maternal confidence and maternal social connectivity.

Conclusions: This is the first study to evaluate the antenatal parenting intervention Mellow Bumps in an online format, namely Online Mellow Bumps. The online format makes the programme accessible for at-risk mothers and families, with the potential to continue reaching wider audiences beyond the pandemic who otherwise might struggle to access support. The findings show that the online group can be effective in improving mental health symptoms and mental well-being, supporting expectant mothers before the baby is born. Future research using a control group, a larger and more inclusive sample, and assessing the longer-term effects on parent and child would be beneficial.

Introduction

With the continuous rise of mothers experiencing poor mental health, maternal mental health remains a critical focus around the world. A previous evaluation in by Hendrick et al. (1998), indicated a 10% prevalence of mental health problems in pregnant women, and a 13% prevalence in women who have given birth. In 2015, the prevalence had risen to approximately 20% of women experiencing mental health problems during pregnancy or after giving birth (Davies, 2015). Research for low- and middle- income countries is sparse, though typically prevalence for poor maternal mental health are higher than for high income countries (Fisher et al., 2012). There are many contributing factors to mental health during and after pregnancy, such as having a high-risk pregnancy, fear of labour, daily life including home and work, access to social support, and socio-economic status (Feligreras-Alcalá et al., 2020; Yu et al., 2020; Orr, 2004; Kim et al., 2018).

A lack of mental health recognition throughout pregnancy can result in repeated adverse environmental exposure for the foetus, leading to a number of emotional, cognitive, or behavioural

* Corresponding author at: Institute of Psychiatry, Psychology and Neuroscience, King's College London, Strand, London WC2R 2LS, United Kingdom.
E-mail address: alex_miles@live.com (A. Miles).

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developmental deficits which can persist throughout the lifetime (Glover, 2014). Furthermore, maternal mental health is a key factor that affects parent-infant attachment throughout childhood. Evidence from a Turkish sample indicates that mothers who are diagnosed with a mental health disorder have lower maternal attachment scores in the prenatal and postnatal periods (Özcan et al., 2018), and a maternal avoidant attachment style is reported to prevent mothers from forming a positive relationship with their child (Sümer et al., 2016). The parent-infant attachment formed during pregnancy persists postnatally and shapes the infant's future relationships throughout their life. It is therefore in the best interest of the child to promote the mental health and well-being of the mother, which in turn improves the quality of the pregnancy and the quality of the parent-infant relationship, promoting healthier outcomes from as early as pregnancy (Luoto et al., 2013).

Moreover, in addition to the typical stressors of pregnancy, the COVID-19 pandemic has resulted in increased exposure to stressful life events and isolation due to worldwide lockdowns, which has had a negative impact on the mental health of pregnant women and mothers (Yan et al., 2020). Reported prevalence for anxiety, depression and psychological distress amongst pregnant women are 37%, 31% and 70% respectively, indicating a deterioration in mental health in comparison to pre-pandemic levels.

The current study aims to evaluate the implementation of antenatal parenting intervention Mellow Bumps in an online format and determine if this can be done safely and without detriment to pregnant women, using routine evaluation data which is collected by Mellow Parenting to continuously monitor their interventions. In January 2021, Mellow Parenting introduced the online provision of their Online Mellow Bumps programme in Turkey, following successful piloting within the UK, which enabled their practitioners to safely reach pregnant women across the country to offer timely intervention to protect maternal mental health and longer-term offspring outcomes.

Online Mellow Bumps

Pregnancy can be a time where parents are most receptive to support, which makes it a vital time for them to be able to access it when it is needed. One such organisation that provides support is Mellow Parenting (mellowparenting.org). Mellow Parenting support families and children around the world by providing evidence-based psychological interventions both pre- and postnatally. Their interventions are aimed towards families from socially and psychologically vulnerable populations who might otherwise struggle to access antenatal support. They seek to create a safe, accessible atmosphere where parents can navigate programmes together, overcoming barriers to antenatal support by making their programmes easy to access e.g., providing transport, childcare and refreshments.

Mellow Parenting firmly believes that successful parenting programmes should be delivered face-to-face in order to build relationships and trust, and also to help with reducing feelings of anxiety, depression and isolation. However, as a result of the COVID-19 pandemic, the original face-to-face Mellow Bumps programme was unable to go ahead as scheduled. Unable to receive the support they needed, this meant that parents and children were left at risk. Mellow Parenting noted the importance of the continuity of support and proposed online strategies for some of their interventions. One of the interventions that went online was Mellow Bumps – becoming Online Mellow Bumps.

Modelled on the original offline Mellow Bumps intervention, online Mellow Bumps is a seven-week group based intervention for parents-to-be. The intervention's underpinning values are based on the psychological theories of attachment, social learning and cognitive behavioural therapy and focus on improving parent-child relationships. The programme aims to encourage nurturing, engagement and attunement between mother-to-be and baby by decreasing maternal antenatal stress levels and increasing expectant mothers' understanding of the neonate's capacity for social interaction. It also aims to reduce social isolation and increase the mother-to-be's awareness of her own circumstances and confidence to access further support should she need it. The group encourages the parents to keep the baby in mind, explore support networks and practice new skills such as mindfulness through fun home activities. In developing this education and skillset, the programme also seeks to minimise the risk of maternal mental health in the postnatal period. The intervention is offered between 20 and 30 weeks' gestation for a period of seven weeks; one day a week for approx. two hours and is facilitated by two trained practitioners who are trained by the intervention developers. Mums-to-be receive their workbooks in the post and the groups are delivered via Zoom.

Offline Mellow Bumps necessitates that the participants live in the same province, or sometimes in the same region of the province if it is a big province like Istanbul. As Mellow Parenting programmes were very recently introduced to Turkish participants, there are very few "offline" program experiences, though if the offline delivery continues the groups would require local participants. On the other hand, online program recruitment is more flexible and wide-reaching. The criteria for inclusion includes willingness to participate and being able to provide a tablet or computer with internet access. Referrals can be taken from agencies as well.

Mellow Bumps was previously piloted in 'offline' groups (face-to-face format) in Turkey on a small scale with 9 participants to evaluate the effectiveness in Turkish culture (Dagli et al., 2017). The programme was found to be a useful tool which increased emotional well-being and increased attachment to their child. Though it is unknown whether the same content will be as effective in an online format.

Existing maternal mental health services in Turkey

More pregnant women are receiving antenatal care in Turkey, although this traditionally focuses on the physical health of the mother and the baby. Though, Turkey has begun to achieve better maternal outcomes as a result of improved maternal care facilities and educational interventions delivered to mothers and professionals (Kültürsay, 2011). One educational intervention that currently runs in Turkey is the Mother Support Program by AÇEV (acev.org) which supports mothers with children aged 3 to 11 years of age by educating them about child development, upbringing and positive relationships. It also educates mothers about their physical health such as reproductive health and breast cancer. Another educational programme running in Turkey is Triple-P (triplep.net). Triple-P aims to prevent and treat problem behaviour in children by educating about child development, and also promote positive family environments. Both of the interventions are evidence-based, though they target mothers who have already given birth, primarily addressing problems with child behaviour. Turkey is recognising the benefits of evidence-based interventions and seeking to implement these as opposed to non-evidence-based (Erbaydar, 2021). However, there is a gap here in the support network for expectant mothers who seek to improve their mental health and parent-child relationship before the baby is born.

Aims

The aims of this study have been determined based on the routine evaluation data that Mellow Parenting collect to continuously monitor their programmes. As such, the aim of the current

study is to evaluate the implementation of antenatal parenting intervention Mellow Bumps in an online format and determine if this can be done safely and without detriment to pregnant women in Turkey.

It will do this by exploring (1) whether Mums-to-be find the online format accessible, (2) impact on maternal mental health symptoms - anxiety, depression and stress, (3) impact on maternal well-being, (4) impact on the bond with their baby, (5) impact on mums-to-be confidence, (6) impact on feelings of social connectivity.

Method

Design

This study utilised an exploratory study design to investigate routine evaluation data that had been collect at both pre- and post-intervention stage from January 2021 to May 2021. Ethical approval was sought and granted by the Ethical Board on Human Studies at Instinye University, Istanbul. Approval was granted on 4th October 2021, reference number 21–79.

Participants

There were 128 mums-to-be who took part in the Online Mellow Bumps programme between January 2021 and May 2021. The study used a convenience sample where participants volunteered to take part in the group through self-referral; none of the mums-to-be were chosen for or referred to the programme, rather they were predominantly recruited by the group facilitator via social media or word of mouth. The only criteria for engagement in the intervention was that they were in their third trimester of pregnancy. As each facilitator recruited their own participants, there was no central location. The program would be delivered online meant that it was not important in which province the participants were living which was an advantage. Participants accessed the programme from a total of 21 different provinces in Turkey; predominantly Istanbul (46) and Ankara (25) (n.b. location data was received for 105 participants).

Procedure

All evaluation data was collected via an online survey created using *Qualtrics* (www.qualtrics.com). The routine evaluation process involved providing participating mums-to-be with an online *'Parent pre-group'* questionnaire link prior to the intervention beginning, and a *'Parent post-group'* questionnaire link when the intervention had ended. These links contained a consent form followed by a sequence of self-report measures.

Participants were required to complete the post-group link within 2 weeks of their last session. Any responses that were received more than 14 days after group conclusion were considered late and not included in the data for analysis; this cut-off was proposed in order to determine an end-point for data collection in May 2021. This cut-off was also proposed to allow time for participants to respond whilst also capturing the data as close to the end of group as possible, thus minimizing the impact of extraneous variables that may otherwise have affected participant responses. In the Offline group, responses are typically gathered via questionnaire on the same day of the last session.

Practitioners were also presented with a '*Practitioner Post-Group*' questionnaire link for the purpose of obtaining group information such as attendance data. Fidelity of program delivery was monitored throughout the intervention stage by mandatory reflective consultation sessions between group practitioners and senior Mellow Parenting trainers.

Intervention

All practitioners completed full training in Online Mellow Bumps as a prerequisite to any group delivery. Groups were delivered online using the video conferencing platform Zoom and would consist of 2 practitioners and between 6 and 8 mums-to-be. Participants were allocated in the order that they were recruited. Each group would run over 7 weekly sessions and last approximately 90 minutes each. There was an additional eighth 'Partners Session' that groups had the option to run. A total of 20 groups were delivered between January and May 2021. Before the first group and after the final group, participants are offered an evaluation questionnaire which collects demographic information and information for the following variables: maternal mental health – stress, depression and anxiety, maternal well-being, perceived quality of relationship with the baby, online feasibility, confidence level, and feelings of social connectivity.

Measures

Participant Demographics. On the parent pre-group questionnaire, participants were asked a series of questions to give their age, nationality, history of mental health (yes/no), employment status, highest level of education, and relationship status.

Mental health symptoms. On the parent pre- and post-group questionnaires, participants were presented with the *Depression, Anxiety and Stress Scale – 21 Items* (DASS-21; Lovibond and Lovibond, 1995). The DASS-21 produces separate scores for 3 self-report subscales: Depression, Anxiety and Stress. There are 7 statements for each subscale relating to the respondents' experience of the previous week, such as "I found it hard to wind down", with responses made on a Likert scale to express how much the statement applies to themselves: "Did not apply to me at all" - 0; "Applied to me to some degree, or some of the times" - 1; Applied to me a considerable degree or a good part of the time" - 2; "Applied to me very much most of the time" - 3. Scores are calculated per subscale and multiplied by two, giving a maximum score of 42, with higher scores indicating higher levels of depression, anxiety or stress. The cut-off values for each subscale are outlined in Fig. 1. There is sound evidence of this measure's reliability and validity as an instrument in Turkish (see Sariçam, 2018). The DASS-21 is not a diagnostic measure.

Maternal subjective well-being. On the parent pre- and post-group questionnaires, participants were presented with the *World Health Organisation – Five Well-Being Index (WHO-5; WHO, 1998).* The WHO-5 presents respondents with 5 positive statements relating to the previous 2 weeks, such as "I have felt calm and relaxed", responses are made on corresponding Likert-scales to express how often the respondents have experienced these statements ("All of the time", "Most of the time", "More than half of the time", "Less than half of the time", "Some of the time", or "At no time"). The responses give a total score of 0 to 25, which is then multiplied by 4 to produce a final 'Percentage Score' out of 100. Higher scores indicate greater levels of well-being. It has been shown to have good

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Fig. 1. Cut-off values for each subscale for DASS-21.

reliability and validity in Turkish application (see Eser et al., 2019). The WHO-5 is not a diagnostic measure.

Perceived quality of relationship with baby. On the parent pre- and post-group questionnaires, participants responded to the 'Bumps Tunnel'; this is a non-validated visual scale developed by the Mellow Parenting Evaluation Team to give a snapshot measure of perceived quality of relationship with their baby. Participants are asked to rate the relationship with their unborn child between 0 and 10, with 10 being the best possible relationship.

Online feasibility. The post-group evaluation consists of a non-standardised 5-point Likert scale feedback questionnaire. The relevant statements for online feasibility are: "I felt comfortable with using the technology, such as video calls, in the Online group", "I would take part in an online group again" and "I have found completing the evaluation questionnaires straightforward". This measure is also evaluated by intervention completion rate.

Maternal confidence. The relevant statements for confidence outcomes are: "After taking part in the group, I feel better about myself", "I feel confident in asking for help should I need it" and "This group has helped me to identify my personal strengths".

Maternal social connectivity. The relevant statements from the feedback questionnaire for social connectivity within the intervention group are: "I have made new friends through this group who I would like to keep in touch with" and "I would like to keep in touch with the service who delivered this group".

Statistical analysis

The data were analysed using SPSS version 27 using a significance level of 0.05. First, we collated frequency and percentages for demographic characteristics of the sample. Second, paired-samples t-tests were performed individually for stress, depression and anxiety symptoms (mental health symptoms), maternal subjective well-being and perceived quality of relationship with the baby to explore the differences pre- and post-group. Effect sizes were reported using Cohen's *d*. The variation in demographic statistics was not substantial enough to perform analysis within the sample. Third, we calculated frequency and percentages for the responses to the parent post-group evaluation questionnaire, which included statements for online feasibility, perceived quality of the relationship with baby, maternal confidence, and maternal social connectivity.

Results

Of the 128 participants enroled for the programme, attendance data is available for 114. In total, 102 participants completed 5 or more sessions, with an average of 6.06 out of 7, which is considered completion of the programme. This gives an intervention completion rate of 89.5%. A total of 71 out of 128 responses were excluded for the following reasons: declined consent/consent not given ($n = 5$), response not completed within two weeks of completing final session ($n = 8$) and no complete pre- and/or post-response sets for any of the scales ($n = 58$). Therefore, leaving 57 responses eligible for inclusion with at least one complete pre- and post- response set (n.b. at least one, but not all, of the measures had to be completed to be eligible). This gives a response rate of 44.5% for evaluation. Fig. 2 shows the response completion for both pre- and post-evaluation.

Participant demographics

The age range for the mothers was 22 years to 48 years, with an average age of 30.65 years. The majority of the mothers were married/in a civil relationship, Turkish nationality, in full-time employment, and with no formal mental health diagnosis. Participants attended an average of 6.35 sessions. *Table 1* shows the full characteristics of the participants included for analysis ($N = 57$); as well as the full characteristics for all participants who were excluded from analysis but completed the programme, consented and provided demographic information ($N = 50$).

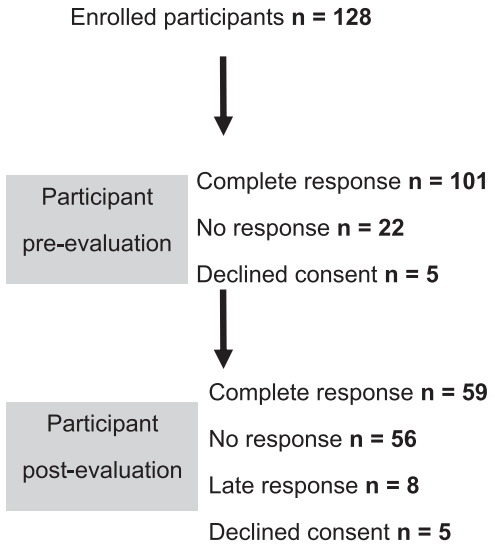

Fig. 2. Participant response completion throughout pre-evaluation and post-evaluation.
Note. Complete response indicates that at least one measure was completed at both pre- and post-group. For example, participants may have completed the "mental health symptoms" measure (DASS-21) but not the "maternal subjective well-being" measure (WHO-5), "perceived quality of relationship with the baby" measure (Bumps Tunnel) or the "post-group evaluation questionnaire". Thus, different numbers of participants are evident across the individual measures.

Analysis of scales for mental health symptoms, maternal mental well-being and perceived quality of relationship with the baby

Paired-samples t-tests were conducted using SPSS version 27 to compare pre-group and post-group scores for each scale.

Maternal Subjective Well-being. There were 56 complete pre-group and post-group responses for the WHO-5 scale. Post-group scores (75.14 ± 7.37) were significantly higher than pre-group scores (63.21 ± 10.11); $t(55) = -4.53$, $p < .001$, $d = 4.92$.

Mental health symptoms

Depression. There were 54 complete pre-group and post-group responses for the depression subscale of the DASS-21. There was no significant difference between pre-group (7.00 ± 5.64) and post-group scores (5.78 ± 5.09); $t(53) = 1.66$, $p = .052$, $d = 2.71$.

Anxiety. There were 54 complete pre-group and post-group responses for the anxiety subscale of the DASS-21. There was no significant difference between pre-group (9.30 ± 5.24) and post-group (8.67 ± 5.92) scores; $t(53) = 1.05$, $p = .148$, $d = 2.20$.

Stress. There were 54 complete pre-group and post-group responses for the stress subscale of the DASS-21. Post-group scores (9.22 ± 5.99) were significantly lower than pre-group scores (11.33 ± 6.81); $t(53) = 2.79$, $p = .004$, $d = 2.78$. It is noted that pre-group and post-group mean scores are within the 'normal' range.

Perceived quality of relationship with the baby. There were 39 complete pre-group and post-group responses for the X Tunnel. Post-group scores (8.58 ± 1.27) were significantly higher than pre-group scores (7.65 ± 1.90); $t(38) = -3.62$, $p < .001$, $d = 1.62$.

Table 1
Demographic Characteristics for the 57 Participants Included for Data Analysis, and the 50 Participants Excluded from Data Analysis.

Characteristic	Participants included in analysis: N out of 57 (%)	Participants excluded from analysis: N out of 50 (%)
Age (mean)	30.65 years	30.32 years
Relationship Status		
Married/civil relationship	46 (80.7%)	36 (72%)
In a relationship and not living together	0 (0%)	0 (0%)
Divorced	0 (0%)	1 (2%)
Unspecified	11 (19.3%)	13 (26%)
Nationality		
Turkish	54 (94.7%)	49 (98%)
British	0 (0%)	1 (2%)
Estonian	1 (1.8%)	0 (0%)
Unspecified	2 (3.5%)	0 (0%)
Employment Status		
Full-time	31 (54.4%)	24 (48%)
Part-time	3 (5.3%)	2 (4%)
Student	1 (1.8%)	1 (2%)
Unemployed	8 (14%)	7 (14%)
Unspecified	14 (24.6%)	16 (32%)
Education		
Still at school	39 (68.5%)	25 (50%)
Finished school	5 (8.8%)	9 (18%)
Attending college	5 (8.8%)	6 (12%)
Attained college qualification	5 (8.8%)	7 (14%)
Unspecified	3 (5.3%)	3 (6%)
Formal Mental Health Diagnosis		
Yes	0 (0%)	1 (2%)
No	57 (100%)	49 (98%)
Attendance		
1 session	0 (0%)	2 (4%)
2 sessions	0 (0%)	0 (0%)
3 sessions	1 (1.8%)	0 (0%)
4 sessions	1 (1.8%)	2 (4%)
5 sessions	6 (10.5%)	4 (8%)
5.5 sessions	0 (0%)	1 (2%)
6 sessions	12 (21.1%)	4 (8%)
7 sessions	28 (49.1%)	14 (28%)
Unspecified	9 (15.8%)	23 (46%)

Analysis of post-group evaluation questionnaire

Post-group evaluation data was collected from 56 participants (see *Table 2*).

Online feasibility. In terms of the group being online for the first time, 98.2% agreed or strongly agreed that they 'felt comfortable with using the technology, such as video calls, in the Online group', and 92.9% agreed or strongly agreed that they 'would take part in an online group again'.

Social connectivity.94.6% agreed or strongly agreed that they 'have made new friends through this group who I would like to keep in touch with', whilst 96.4% agreed or strongly agreed that they 'would like to keep in touch with the service who delivered this group'.

Confidence.96.4% agreed or strongly agreed that 'after taking part in the group, I feel better about myself', 94.7% agreed or strongly agreed that they 'feel confident in asking for help should I need it', and 75.0% agreed or strongly agreed that 'this group has helped me to identify my personal strengths'.

Discussion

Maternal mental health is a notable issue affecting mothers around the world both prenatally and postnatally. As a result of the COVID-19 pandemic, pregnant women are facing increased stressors, uncertainty, and isolation. The aim of the current study was to evaluate the implementation of antenatal parenting intervention Mellow Bumps in an online format and determine if this can be done safely and without detriment to pregnant women in Turkey. The study has shown that: (1) Mums-to-be found the online format accessible, (2) Online Mellow Bumps improves maternal stress levels, though does not significantly improve maternal depression levels or maternal anxiety levels; (3) Online Mellow Bumps improves maternal well-being; (4) Online Mellow Bumps helps mums-to-be feel a stronger bond with their baby; (5) Online Mellow Bumps increases mums-to-be confidence; (6) Online Mellow Bumps increases mums-to-be feelings of social connectivity.

This is the first study to evaluate Online Mellow Bumps in its new format, using a sample of mums-to-be from across Turkey. The findings show that Online Mellow Bumps can be delivered safely and effectively, allowing Mums-to-be to access support to an acceptable level and without detriment to their mental health and well-being. The findings show improvement to stress levels, perceived quality of relationship with baby and confidence. It is important to note that pre-group and post-group mean scores for stress levels were within the 'normal' range. As such, the improvement in the mean scores that we have shown is within mums-to-be reporting stress at the lowest range and the level does not change. Nevertheless, these improvements show hopeful signs of mums-to-be strengthening the foundations for a positive parent-infant relationship moving forward through access to an online intervention. The findings also show that mothers report feeling more socially connected with other mums-to-be. In accordance with the stress-buffering hypothesis (Cohen and Wills, 1985), the presence of a positive, strong social support network weakens the negative mental and physical implications of stressful situations which makes a support network a really important factor for pregnant women who can often feel isolated and lonely (Wu et al., 2020).

Our findings are consistent with the previous pilot study findings from Dagli et al. (2017) which suggested that Mellow Bumps improved emotional well-being and perceived attachment to the child. Using a larger sample, the current study has shown Online Mellow Bumps to support mothers in improving their well-being and parent-infant relationship before the baby is born, which is currently a gap in the educational programmes provided for expectant mothers in Turkey. 98.2% of mums-to-be reported that they felt comfortable using the technology for the online group, whilst 92.9% reported that they would take part in an online group again; these responses are indicative of a successful transition into online delivery.

The transition of Mellow Bumps from physical delivery to an online programme during the COVID-19 pandemic has enhanced the accessibility of the programme for 'at-risk' mothers and families. The level of participation for the programme itself were high, with a completion rate of 89.5%, which suggests that the programme in its online format is engaging. It has overcome the logistical barriers that the pandemic presented which prevented traditional 'offline' groups from taking place, whilst still delivering the intervention successfully. Moreover, the online format helps to alleviate previous issues of costs and high-intensity demand of resources by Mellow Parenting (Raouna et al., 2021). The results of this study show that Online Mellow Bumps could continue to benefit expectant mothers beyond the restrictions of the pandemic by continuing to reach a wider audience of mothers. For example, mothers who may live too far away to travel to a face-to-face group, or mothers who may not attend a face-to-face group due to struggles with their mental health: mothers experiencing mental health are less likely to attend their appointments (Redshaw and Henderson, 2013). The online format allows mothers to attend the group and connect with other mothers whilst remaining in their own space.

Table 2
Descriptive Statistics for the Post-group Evaluation Questionnaire - Evaluating Maternal Confidence, Maternal Social Connectivity and Online Feasibility.

Statement (n)	Strongly Agree	Agree	Somewhere In The Middle	Disagree	Strongly Disagree
I have made new friends through this group who I would like to keep in touch with ($n = 56$)	36 (64.29%)	17 (30.36%)	3 (5.36%)	0 (0%)	0 (0%)
I would like to keep in touch with the service who delivered this group ($n = 56$)	36 (64.29%)	18 (32.14%)	2 (3.57%)	0 (0%)	0 (0%)
After taking part in the group, I feel better about myself ($n = 56$)	33 (58.93%)	21 (37.50%)	2 (3.57%)	0 (0%)	0 (0%)
I found the topics in the group relevant to me and my family situation ($n = 56$)	34 (60.71%)	22 (39.29%)	0 (0%)	0 (0%)	0 (0%)
I feel more connected with my baby / child after taking part in this group ($n = 54$)	31 (57.41%)	22 (40.74%)	0 (0%)	1 (1.85%)	0 (0%)
The group has given me a new perspective on my relationships ($n = 56$)	33 (58.93%)	17 (30.36%)	5 (8.93%)	1 (1.79%)	0 (0%)
X has helped me identify what is important to me ($n = 56$)	26 (46.43%)	25 (44.64%)	5 (8.93%)	0 (0%)	0 (0%)
This group has helped me to identify my personal strengths ($n = 56$)	26 (46.43%)	16 (28.57%)	14 (25.00%)	0 (0%)	0 (0%)
I feel confident in asking for help should I need it ($n = 56$)	29 (51.79%)	24 (42.86%)	3 (5.36%)	0 (0%)	0 (0%)
I found the relaxation and/or mindfulness activities helpful ($n = 54$)	34 (62.96%)	19 (35.19%)	1 (1.85%)	0 (0%)	0 (0%)
I felt comfortable with using the technology, such as video calls, in the Online group ($n = 55$)	31 (56.36%)	23 (41.82%)	1 (1.82%)	0 (0%)	0 (0%)
I would take part in an online group again ($n = 56$)	34 (60.71%)	18 (32.14%)	2 (3.57%)	2 (3.57%)	0 (0%)
I have found completing the evaluation questionnaires straightforward ($n = 56$)	27 (48.21%)	23 (41.07%)	5 (8.93%)	1 (1.79%)	0 (0%)

Our findings did not demonstrate improvements in depression and anxiety levels as a result of participation. Depression and anxiety are typically long-lasting, enduring disorders which may require long periods of support, and also a combination of methods, to see a change in symptoms (Mental Health Foundation, 2021a, 2021b). Therefore, during the period of time from pre-evaluation to post-evaluation, the mothers may not have experienced a significant change to their depressive or anxious symptoms. It is noted that despite no significant improvement in depression and anxiety levels, the scores remained similar and within the same range (normal and mild respectively) which indicates that there was no negative impact as a result of completing Online Mellow Bumps. Future research would do well to follow-up mothers at later timepoints to establish whether the group has had long-term improvements. In the meantime, the measures used to determine depression and anxiety levels could be used to pinpoint mothers who are reporting high levels of depression and anxiety symptoms. This information can be used to offer further guidance and support from relevant health professionals.

Limitations

The current study does not come without its limitations. First, the completion of the evaluation questionnaires saw a response rate of 45.5%. However, it is important to note that levels of participation for the programme itself were high which suggests that the programme is engaging. It is not compulsory for participants to complete the questionnaire, nor is there any incentive to do so. Typically, they would be prompted to do so if they wish at their face-to-face group. However, with the evaluation questionnaire being distributed online, it was difficult for practitioners to track and chase the progress of questionnaire completion. There were no notable differences in the demographic information between the participants who were included and excluded for analysis. There are adjustments to be made to the evaluation process to ensure it captures the data of as many participants as possible.

Second, is that external factors were not taken into consideration during analysis. The current study analysed only the impact of the Online Mellow Bumps programme on maternal factors pre- and post- group. It did not account for extraneous variables such as socio-economic status, existing support network, or previous medical history. Not only this, but there also was no control group to make a comparison with and so causality cannot be established from these findings.

Third, since the sample was primarily married/in a civil relationship, full-time employed, and with no history of mental health, caution must be exercised in generalizing to diverse populations. The mean scores both pre- and post-group for depression and stress subscales were within 'normal' range, thus improvement in these areas may not be applicable to clinical populations. The mean scores pre- and post-group for anxiety were within 'mild' range and showed no statistically significant change. The sample does not represent equal proportions of demographic variation from the wider population, and particularly may not represent mums-to-be from at-risk groups. Therefore, the findings do not represent the diversity of the population and should be interpreted with caution. It is recognised that the online delivery of the group was accessible specifically for the participants recruited within this review, however there may be barriers to online participation such as living in a rural area, no access to technology, or no access to internet. Although the intervention primarily aims to reach at-risk families, at this first step of implementation there was no inclusion criteria such as socioeconomic status or first time mothers. It may be taken into account when demand and resources increase. In the context of the COVID-19 pandemic where face-to-face delivery wasn't possible, the online delivery sought to continue to reach mums-to-be where this was possible. As the online delivery continues and develops past the pilot stage, further research is required into the accessibility and impact for more at-risk populations such as lower socio-economic status.

Finally, the 'Bumps Tunnel' used to measure the closeness with the baby is a non-standardised measure created by Mellow Parenting. This measure enables mums-to-be to give a subjective, snapshot measure of their relationship with their baby; thus, it is cost effective and quick to administer. Additionally, observational methods were not possible for this study because the baby has not yet been born. Nevertheless, there are no psychometric measurements of the measure to draw conclusion of reliability and validity of the 'Bumps Tunnel'. As such, the results from this measure should be considered with caution. Future research might benefit from incorporating a more psychometrically robust measure.

Future research

Differences in maternal mental health and maternal care across cultures may result in the programme working differently across different cultures. As such, should also expand to other countries and cultures to examine whether the results extend across and be-

tween different cultures. Future research should also aim to replicate the findings of this study using larger, more inclusive samples with greater representation of demographic variables such as relationship status, level of employment, and level of education. Using a larger sample may improve the effect size of the results, as the effect sizes in our study are small to medium, and strengthen the findings.

Additionally, future research should assess the long-term effects of Online Mellow Bumps beyond the period of group delivery. Long-term effects should include maternal outcomes such as: mental health, mental well-being, confidence and parent-infant relationship. It could also include long-term outcomes for the child by assessing stages of development.

Finally, future research could also assess the difference between face-to-face and online groups to get a good understanding of the effects of both, and to perform a comparison between the two to see if they are as effective as each other.

Conclusion

In conclusion, this review has been the first to evaluate the delivery of the online antenatal programme: Online Mellow Bumps. This review found that online delivery of the programme could be successfully delivered without detriment to the mums-to-be participating, evidenced by high participation rate, high level of comfort using the technology and high level of participants willing to take part in an online group again. Additionally, improvements were found for stress, well-being, confidence, closeness to the baby, and a large proportion of mothers reported an improvement in social connectivity. The online format of the intervention has shown promising potential for continuation beyond the COVID-19 pandemic. Improvements should be sought to increase participation in the evaluation process due to low response rate, though participation in the group was high. Future research using larger samples, more representative populations, and assessing longer-term effects is required to establish stronger data for the programme.

Ethical approval

Ethical approval was sought and granted by the Ethical Board on Human Studies at Instinye University, Istanbul. Approval was granted on 4th October 2021, reference number 21–79.

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Declaration of Competing Interest

Michael Lovell and Raquib Ibrahim were paid employees of Mellow Parenting. Tolga Dagli and Figen Dagli were Mellow trainers. Alex Miles was a placement student with Mellow Parenting from January 2021 to June 2021, continuing voluntarily afterwards.

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