

App-Based Three Good Things and Gratitude Journaling Incentive Program for Burnout in Pediatric Residents: A Non-Randomized Controlled Pilot

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Background

Despite extensive literature measuring the prevalence and the consequences of burnout among resident physicians, effective interventional controlled trials are lacking.^{1;2}

Mindfulness, therapy, and schedule changes have shown small benefits, but require learning a new skill, significant institutional resources, or organizational change.²

Additionally, ability to safely participate in many group or self-care activities has been limited by the recent COVID-19 pandemic. Gratitude³ and three good things³ (G/3GT) journaling are low-cost, individual-level interventions that have been shown to significantly improve measures of burnout, happiness, depression, gratitude, and stress; studies so far have not focused on resident burnout.^{3; 4; 5; 6} We piloted an app-based G/3GT journaling intervention for four weeks with pediatric residents measuring adherence and burnout as primary outcomes, with gratitude and life satisfaction as secondary outcomes.

Educational Approach and Innovation

Setting and Participants

All pediatric residents (n=83) at University of California San Francisco Benioff Children's Hospital Oakland during the academic year of 2020-2021 were eligible for the study.

Due to the growing evidence supporting the benefits of G/3GT journaling in other healthcare settings,^{5; 6; 7} we did not randomize participants due to concerns that it was unethical to deny participants seeking an evidence-based intervention for burnout.

Participants were able to opt into the intervention (n=20) or control group (n=21) using survey links distributed in flyers, emails, and social media posts. Each resident received

\$5 per completed survey and the journaling group received \$50 for the intervention, totaling \$25 for control, \$70 for journaling (supplemental figure). Enrollment was closed when we reached the limits of our gift card budget. Given our small sample size, to protect anonymity participant ID codes were not assigned, thus it was not possible for study organizers to track the burnout responses of an individual.

Intervention

In October 2020, using an app, the journaling group listed three things they were grateful for and three good things daily for four weeks. Journaling participants were sent an app set-up guide and instructed to turn on daily reminder notifications to the time(s) of their choosing. Residents received no further education or training on gratitude, three good things journaling, or resilience.

Both intervention and control groups filled out surveys before, during, and up to six months after the intervention (supplemental figure).

Measured Outcomes

Each survey measured burnout, feasibility, gratitude, and life satisfaction. Burnout was measured using the Oldenburg Burnout Inventory (OLBI)⁸ and the Physician Work Life Study single-item burnout questionnaire (PWLS).⁹ Feasibility was defined as adherence to journaling at least five days per week of the intervention period, monitored by deidentified app screenshots. Gratitude was measured using the Six-Item Gratitude Questionnaire (GQ-6).¹⁰ Life satisfaction was measured via the Satisfaction with Life Scale (SWLS).¹¹

Analysis

We anticipated and accounted for baseline differences in our control and journaling groups by using a difference-in-difference multivariate regression, allowing us to compare the magnitudes of the changes in burnout, gratitude, and life satisfaction between the groups. Cronbach's Alpha was used to evaluate internal consistency of the surveys. Cohen's d effect size was used to standardize comparisons of differences between groups for the multiple scales used.

Results

Study Participants

Compared to controls, a higher proportion of journaling participants were PGY-3 residents ($p < 0.01$). Additionally, many in the journaling group reported accessing a therapist ($p = 0.06$), meditation/mindfulness apps ($p = 0.06$), and self-guided meditation ($p = 0.07$) although these did not reach significance. Baseline participant characteristics were otherwise similar between groups (supplemental table).

Feasibility, Burnout, Life Satisfaction, and Gratitude

Feasibility, measured as journaling adherence over the four-week intervention, was 85% (17/20). The percentage of journaling participants who continued to journal at one month post-intervention was 31% (5/16); 7% (1/16) at six months post-intervention. Survey response rate in the control group was 84% (87/105) and 87% (87/100) in the journaling group.

Baseline levels and trends in burnout, life satisfaction, and gratitude over the course of the study period are shown in Figure 1A-E. Difference-in-difference analysis (Figure 1F) showed that the journaling group had a statistically significant decrease in OLBI-Exhaustion ($p=0.025$) compared to the control group and this trend persisted up to 6 months after the intervention ended. There were no statistically significant changes in OLBI-Disengagement ($p=0.055$), PWLS ($p=0.201$), SWLS ($p=0.446$), or GQ-6 ($p=0.939$) (Figure 1). Cronbach's alpha (>0.6 for all) and power calculations ($>80\%$ for all scales) are shown in Figure 1F.

Discussion and Next Steps

In this single-center non-randomized controlled intervention, G/3GT journaling was low-cost, feasible, and effective in decreasing pediatric resident burnout.

Distinct from prior 3GT studies, our pilot focused on resident physicians and had a control group.^{5,6} Our effect size, a roughly 10% decrease in one measure of burnout from baseline to six months post-intervention, was small, but persisted months after intervention and is comparable in magnitude to prior studies.^{5,6} It is unclear why we did not see improvements in our other two measures of burnout, although notably OLBI-Disengagement had a p-value that trended very close to significance. The PWLS is a single question, and although it is useful as a screening tool for burnout, prior studies have shown it has reduced sensitivity to smaller changes in degrees of burnout.¹² Unlike prior studies,^{3,5,6} we did not see improvements in other positive measures. Given that our initial levels of gratitude and satisfaction were high, it is possible that we were not able to detect small changes given our variance and small sample size.

Continued journaling after the incentive period was not expected or encouraged, because we anticipated results would persist months after journaling stopped - as seen with prior 1-2 week 3GT interventions.^{3; 5; 6} While only a third journaled beyond the incentive period in our study, benefits endured 6 months afterwards. We believe adherence would have been lower if participation were compulsory or unincentivized,⁶ thus we encourage institutions with available funding to offer G/3GT journaling incentive programs given evidence that combining individual with organizational level solutions may be more effective for resident and physician burnout.¹³

Limitations

Since the study was performed at our home institution, and the participant group received varied financial incentives, participant, response, or extrinsic incentive bias could impact our results. We chose the Oldenburg Burnout Inventory because it was free, validated in healthcare workers,¹⁴ and familiar to our residency (previously used as a biannual self-screening tool). However, our effect size may be difficult to compare to other studies using the proprietary Maslach.¹⁵ Deliberately non-randomizing our study may have contributed to baseline differences between groups. Contrary to prior studies¹ which showed that PGY-3's had lower levels or similar levels of burnout to PGY-1's, baseline burnout was higher in the group with majority PGY-3's – the journaling group. Many discounted or free wellness services were marketed to healthcare workers in the early stages of the COVID-19 pandemic, concurrently with our study, which may have contributed to the increased use of wellness resources in the journaling group compared to the controls. We cannot exclude the possibility that those who opted to

journal were more motivated to seek multiple tools to improve their mental health. It is also possible that meditation or therapy may have enhanced the effect of G/3GT journaling or vice-versa.

Next Steps

Our results are promising and could help address a recognized problem in the medical education community. Larger controlled trials of residents at different institutions and specialties are needed to validate the results of our pilot.

Declarations of Interest

The authors declare they have no competing interests. The app used in this study, *5 Minute Journal*, was created by Intelligent Change. The authors received no incentives and are not affiliated in any way with Intelligent Change. Since the intervention described in this study was completed, major revisions of the *5 Minute Journal* app have been made by Intelligent Change and the app now requires a yearly subscription. The authors would like to note that there are many alternative gratitude and 3 good things journaling apps with various features and user interfaces available for free or less than \$6.

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Authorship statement: AM, MR, and SN conceived the study design. AM designed the survey tools, gathered all data, performed preliminary data analysis, and created figures. DS performed statistical analysis and created figures. SN, AM, MR, and DS contributed to drafting of the article and substantially revised it and approved the final version for submission.

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Results of detailed statistical analysis and copies of survey instruments can be made available upon reasonable request from the authors.

Supplemental Content

Supplemental file 1: Supplemental methods chart

Supplemental file 2: Participant characteristics table

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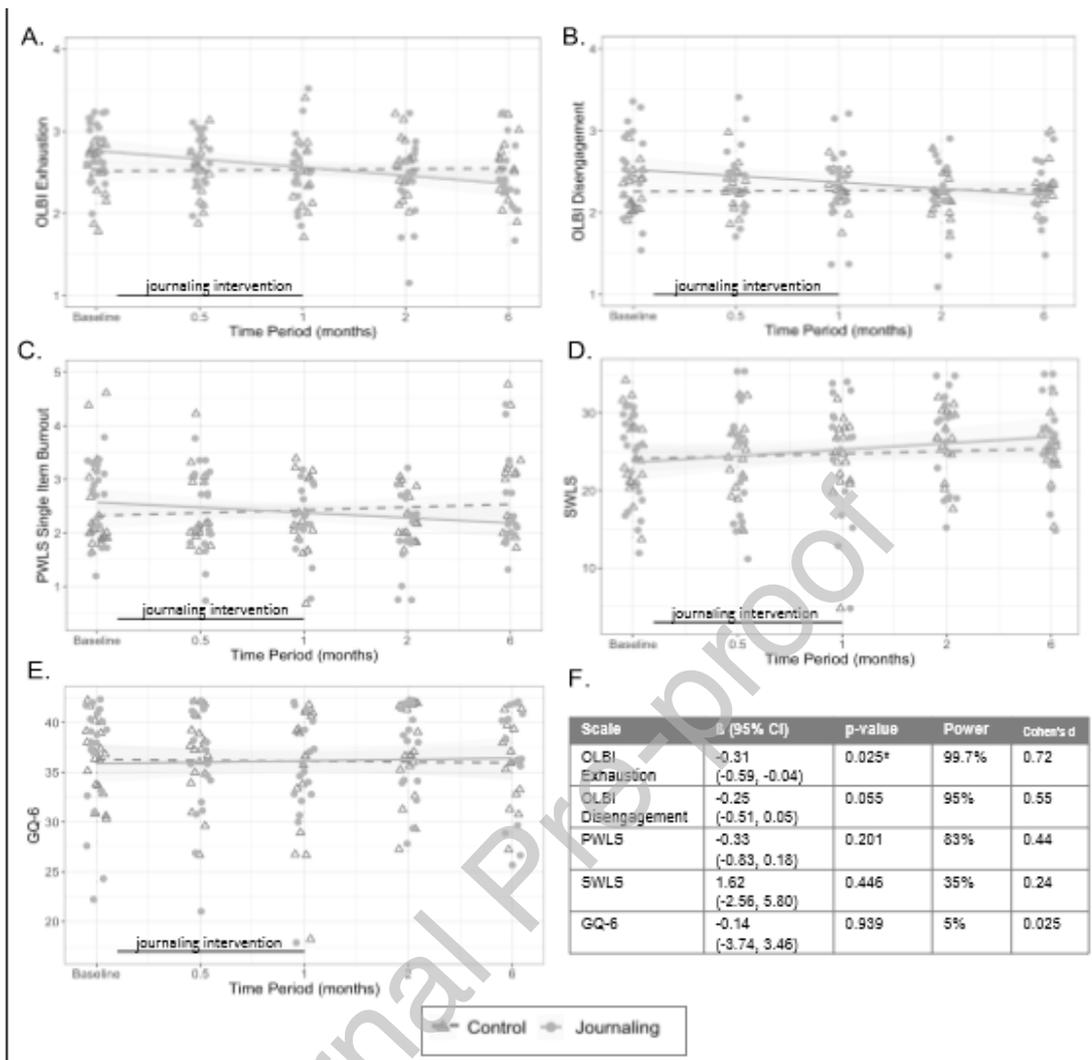


Figure 1. Relationship between burnout and wellness over time, journaling (n=20) vs control (n=21) before, during, and after a 4-week gratitude and 3 good things journaling intervention.

Abbreviations: OLBI, Oldenburg Burnout Inventory; PWLS, Physician Work Life Study single-item burnout questionnaire; SWLS, Satisfaction With Life Scale; GQ-6, 6-Item Gratitude Questionnaire.

(A) Linear regression of burnout measured using OLBI - exhaustion (scale range 1-4)

(B) Linear regression of burnout measured using OLBI - disengagement (scale range 1-4).

(C) Linear regression of burnout measured using the PWLS (scale range 1-5)

(D) Linear regression of life satisfaction measured using the SWLS (scale range 5-35).

(E) Linear regression of gratitude measured using the GQ-6 (scale range 6-42).

(F) Quantitative results of difference-in-difference analysis and statistical significance of the difference in slopes over study time period, calculated as β (slope_{journaling} – slope_{control})