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Marriage Checkup in Integrated Primary Care: A Randomized Controlled Trial With Active-Duty Military Couples

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Abstract

Objective: This study assessed the efficacy of the Marriage Checkup, as adapted to integrated primary care settings and active duty military couples, for improving relationship health, and depressive symptoms. **Method:** Married couples (N = 244, M_{age} = 32.4, 67.6% Caucasian) in which at least one member was active duty Air Force were recruited from bases across the U.S. via online advertisement, emails sent from medical clinics to enrolled beneficiaries, social media posts, and flyers, and randomly assigned to active treatment or wait-list control. Treatment and control couples were linked in pairs sequentially and pairs completed 9 sets of questionnaires at baseline, and one- and six-months post treatment. Outcome measures included the Couples Satisfaction Index, Intimate Safety Questionnaire, Responsive Attention Scale, Partner Compassion Scale, Communication Skills Test, and the Center for Epidemiologic Studies Depression Scale. **Results:** A 3-level multilevel model indicated, after adjustment for multiple comparisons, treatment couples experienced statistically significant small to moderate improvements compared to the control group (Cohen's *d* from 0.21 to 0.55) at 1 month that were sustained at 6 months for relationship satisfaction, responsive attention, compassion towards their partner, communication skills, intimate safety, and depressive symptoms. **Conclusions:** A longitudinal randomized control trial of the MC supports the hypotheses that the MC significantly improves relationship satisfaction, intimacy, communication, partner compassion, responsive attention, and depressive symptoms. Implications for theory, treatment, and dissemination are discussed.

Public Health Impact Statement

Poor marital relationship quality is positively associated with a multitude of negative health outcomes. Effective tertiary couple therapies exist but are underutilized and have limited reach into the population. We adapted a brief prevention and early intervention relationship health protocol for use with military couples in integrated primary care. The Marriage Checkup attracted couples across the continuum of relationship health and significantly improved relationship quality compared to a control condition. Brief preventative interventions lower barriers to care, prevent health deterioration, and effectively improve relationship health functioning.

Marriage Checkup in Integrated Primary Care: A Randomized Controlled Trial with Active Duty Military Couples

Marital health has been associated with a range of mental and physical health outcomes, including risk factors for suicide (Bush et al. 2013; Stack & Scourfield, 2015), intimate partner violence (Foran, Slep, & Heyman, 2011), substance abuse (Whisman, Uebelacker, & Bruce, 2006), depression (Whisman & Uebelacker, 2009), and PTSD (Allen, Rhoades, Stanley, & Markman, 2010). For active duty military couples, relationship health plays an important role in buffering the strain of combat deployments (Balderrama-Durbin, et al., 2015; Balderrama-Durbin, et al., 2013). Of note, a recent study of active-duty Soldiers found that marital distress was positively associated with past 30-day incidence of suicidal ideation and predicted new cases of major depression, generalized anxiety, and posttraumatic stress disorder assessed 5 years later (Whisman, Salinger, Gilmour, Steele, & Snyder, 2021; Whisman, Salinger, Labrecque, Gilmore, & Snyder, 2020). Active duty couples who are more openly affectionate and supportive of one another tend to also cope better with the military lifestyle in general (Lucier-Greer, et al., 2020). Thus, reaching military couples with relationship help may have substantial benefit benefits to the military community.

Barriers to Relationship Help Seeking

Barriers to relationship help seeking are high, including partners' lack of confidence in the outcome, preference to solve problems on their own, and logistical challenges such as cost, conflicting schedules, and lack of childcare (e.g. Uebelacker, Hecht, & Miller, 2006). Additionally, seeking help as a couple requires the buy-in of both partners, either of whom can refuse to participate (Fleming & Cordova, 2012).

Although evidence suggests that couple counseling is effective, with the average treated couple faring better than about 70-80% of untreated couples (Gurman, 2011), the percentage of military service members in distressed relationships who attend therapy is low. In a recent Air Force study, only 6% of Airmen in distressed relationships reported making use of couple counseling after returning from deployment (Snyder et al., 2016). Generally, distressed couples have been reported to wait an average of 2-3 years before seeking help (Doherty et al., 2021). Even lengthier delays (an average of 5.6 years) in seeking couples counseling have been found for military veterans and their partners (Jarnecke et al., 2020).

Evidence suggests that relationship interventions with military veteran couples, both in-person and online, improve relationship functioning (e.g., Georgia Salivar., et al. 2020; Doss et al., 2012). In addition, brief couple intervention continue to be developed (Doss, et al., 2020) as have studies of interventions for hard to reach couples (Barton, et al., 2018). However, these previous studies consisted primarily of veteran couples, rather than active duty couples, and required a substantial investment of time (e.g., 7 hours over 6 weeks; Georgia Salivar., et al. 2020). A brief (3, 30-minute sessions), low-barrier couple intervention adapted for active duty military couples and thoroughly integrated into the more commonly available health structure of primary care settings has not previously been subjected to a randomized control trial.

Integrated Primary Care

The integration of behavioral health providers into primary care creates opportunities to reach a greater proportion of community members (Lindahl & Wigderson, 2016). In a fully integrated care model, mental health providers are embedded into the primary care setting and serve as behavioral health consultants (BHCs) to the medical providers (Vogel et al. 2017). The availability of a BHC in primary care increases the rate of referral follow-through by patients and

may reduce help-seeking stigma (Rowan et al., 2020). A limitation of the BHC research literature is that relatively few protocols for treating psychological problems have been adapted for BHC use in primary care, i.e., delivered in four to six 30-minute face-to-face appointments, and tested in randomized controlled trials (RCT; Hunter et al., 2018). Relationship distress and mental health problems frequently co-occur in primary care patients (Woods & Denton, 2014). As a result, some integrated primary care clinics have begun including marriage and family therapists as team members (Marlowe, Hodgson, Lamson, White, & Irons, 2012). Yet there has been no effort toward developing and testing brief marital interventions suitable for use by a BHC.

The Marriage Checkup

The Marriage Checkup (MC; e.g., Cordova, et. al., 2014) is an evidence-based program designed to be the relationship health equivalent of physical and dental health checkups – a brief, repeatable, prevention and early intervention program situated between primary prevention and tertiary therapy. The MC consists of both therapeutic assessment and motivational feedback. Therapeutic assessment begins with couples completing a questionnaire assessing both relationship strengths and concerns. Couples then meet with a clinician who conducts a relationship history, reviews the couples' top strengths, and addresses their most pressing relationship concerns. Therapeutic techniques are used to build intimacy, empathic understanding, and a collaborative set. Following the assessment session, a feedback report is constructed providing research-based psychoeducation and health maintenance recommendations. This report is reviewed with the couple at a subsequent session designed to solidify the treatment effects of the previous session and motivate the adoption of healthy relationship habits (for details of the protocol, see Cigrang, et. al., 2016; Gray & Cordova, 2018).

The MC is designed to lower barriers to couple help seeking. The MC is brief and advertised as an informational marital health service rather than therapy, intended for all couples who are interested in learning more about their strengths and areas of concern. The MC has been shown to attract a range of couples from relationally satisfied to severely distressed and to successfully attract couples who would not otherwise seek relationship intervention (Fleming & Cordova, 2012; Morrill, et al., 2011). A randomized control trial with 215 civilian couples demonstrated significant increases in relationship satisfaction, intimacy, and acceptance both in the short term and at two-year follow-up for treatment couples compared to no-treatment control couples (Cordova, et al., 2014).

Conceptually, the theory of distress underlying the MC proposes that partners increasingly avoid the vulnerability inherent in emotionally close relationships because of accumulated unrepaired hurts, particularly involving their perpetual issues (Gray, Cordova, Hawrilenko, Dovala, & Sollenberger, 2018). The MC is designed to facilitate the intimacy process by facilitating partners' sharing the vulnerabilities underlying their most common areas of conflict. Theoretically, facilitating intimate events during the MC should result in increases in partner compassion, leading to increases in intimate safety. In turn, increases in intimate safety should result in greater partner acceptance, and relational reengagement as measured by increases in responsive attention and use of positive communication skills, resulting in overall improvements in relationship satisfaction. Previous research has demonstrated that both intimate safety and partner acceptance mediate the association between participation in the MC and increases in relationship satisfaction (Hawrilenko, Gray, & Cordova, 2016). Further, increases in these various indicators of relationship health, should lead reliably to increases in overall mental health, as measured by decreases in depressive symptoms. Previous research has established that

participation in the MC results in decreases in depressive symptoms mediated by increases in relationship satisfaction (Gray, Hawrilenko, & Cordova, 2019).

Adaptation of the Marriage Checkup for Military Couples Pilot Study

In a pilot study, the MC was adapted for military couples in a primary care setting. Military specific content for the assessment tools in the MC were developed. To fit within a Primary Care setting, the MC was re-formatted into three 30-minute sessions. Session One consisted of the couple's relationship history and each partner's primary strengths, Session Two focused on each partner's primary concern, and Session Three was dedicated to feedback for the couple. Feedback report creation was automated by consolidating common themes from across a library of previously written feedback reports and building a computer database associating each assessed strength and concern with empirically supported feedback. BHCs working in primary care were then trained to offer the intervention within a quasi-experimental research design in which pre-post changes were evaluated within subjects.

Results of the open trial of MC in primary care supported both feasibility and effectiveness (MASKED REFERENCES). Statistically significant pre-post changes were found for all study variables at both two weeks and two months, with effect sizes in the moderate range. In addition, both couples and BHCs reported a high level of satisfaction with the MC intervention itself.

The Current Study

The overall purpose of the present study was to build on the pilot study findings by conducting a randomized trial of the military-adapted MC delivered in primary care by BHCs. The study hypothesis was that military couples who participate in the MC for primary care will demonstrate positive relationship health trajectories for intimacy, acceptance, communication skills, partner compassion, responsive attention, and relationship satisfaction over the course of

six months when compared to couples in a wait-list control condition. A secondary hypothesis was that participants in the MC will demonstrate improvements in depressive symptoms when compared to the wait-list control condition.

Given that previous research has found larger treatment effects for more distressed couples (Gordon, et al., 2018), we tested the hypothesis that the treatment effect on relationship satisfaction will be moderated by relationship distress severity at baseline. Finally, the MC is designed to refer more distressed couples to additional subsequent relationship care. Therefore, we tested the hypothesis that participation in the MC will increase subsequent relationship help seeking, compared to the wait-list control condition.

Method

All study procedures were approved by the 59th Medical Wing Institutional Review Board (San Antonio, Texas).

Transparency and Openness

The study was preregistered on ClinicalTrials.gov (identifier NCT02571478). (https://clinicaltrials.gov/ct2/show/NCT02571478?term=NCT02571478&draw=2&rank=1.) The study did not preregister a data analysis plan. Couples were enrolled in the study beginning in April 2016 and continuing through January 2019. Study data are available from the second author upon request and data usage agreement. Code to reproduce reported results are available from the last author upon request.

Inclusion Procedures

Inclusion criteria were (1) at least one member of couple was on active-duty in the military, (2) couples were married[1], and (3) couples were able to attend one pre-treatment research session to complete informed consent, and three 30-minute in person Checkup appointments. Beyond that there were no exclusion criteria. Couples were recruited via online advertisement, emails sent from medical clinic to enrolled beneficiaries, social media posts, and flyers. The two conditions were outlined as (a) an active treatment (MC-T) with a Checkup immediately after sign-up, and a waitlist Control (WL-C) with a Checkup approximately 6 months after sign-up. All couples were compensated for completing questionnaires at each timepoint ($25 at baseline, $50 at one-month, and $75 at six-month).

The flow of participants is shown in Figure 1. Participants were randomized to either MC-T (n=128) or WL-C (n=116) using sequentially numbered, opaque, sealed envelopes (SNOSE Method; Doig and Simpson, 2005). Couples assigned to different conditions were linked in pairs sequentially (one MC-T couple with one WL-C couple) to ensure similar time lapse between the pre- and post-measurements. MC-T couples completed questionnaires at baseline and one and six months after their Checkup. The linked WL-C couples filled out questionnaires at the same time points as their partner MC-T couple; however, they waited to complete their Checkup until after they had completed the final six-month questionnaire.

[1] Our original vision for study participants was to include committed but not married civilian romantic partners. We learned during the initial IRB protocol submission and review process that non-married civilian partners were not eligible for care at the on-base military medical clinics. As a result, we had to exclude non-married couples with a civilian partner from study participation. The change occurred prior to IRB approval of the protocol. When we began participant enrollment our study advertisements reflected this change. We did not have non-married couples request participation and thus we did not screen any out.

Participants

A total of 244 couples were enrolled between February 2016 and February 2019 across five Air Force bases located in the contiguous United States. 128 were assigned to the MC treatment group and 116 to the waitlist control (Figure 1). One hundred and thirteen couples completed at least one of the three intervention sessions, with 110 completing all three. Participants were an average of 32 years old (range: 20 to 53), 68% white, 14% Hispanic/Latino, and 9% Black/African American. The majority had a college education (interquartile range: 14 to 18 years of schooling) and had a median military rank of E5 (79.9% Enlisted and 20.1% Officer). Twenty-two percent of couples met criteria for relationship distress (Funk & Rogge, 2007). Complete demographic information is included in Table 1. Treatment couples who dropped out before treatment, and all other couples who dropped out before 6-month follow-up, did not differ from completers on the basis of age, family composition, race/ethnicity, military status, or rank. Both types of dropouts had moderately lower relationship satisfaction than completers (Cohen's *d* from 0.53 to 0.63). Primary and secondary outcomes had moderate to high correlations, suggesting the outcomes were distinct but strongly related (Supplementary Table S1).

Measures

Demographics. Twenty-two demographic questions were included measuring race, ethnicity, income, relationship length, education, military history, and number of children.

Marriage Checkup Questionnaires- Air Force (MCQ-AF). The MCQ- AF is a measure used to guide the MC session, and was not used for any statistical analyses. The scale has been adapted to include military-specific items for active duty Air Force couples. The questionnaire assesses 33 strengths and 48 concerns within the relationship.

Responsive Attention Scale (*RAS;* Trillingsgaard & Fentz, 2016) The RAS is 12-item scale measuring partners' responses to various bids for attention. Items are rated on a 1(*very rarely*) to 5 (*very often*) Likert scale. Sample items include "I receive a warm welcome from my partner when we meet at the end of the day," "my partner smiles or laughs if I try to show him/her something funny," and "my partner is present and attentive when we eat together." In the present study, internal consistency was adequate at baseline (Chronbach's alpha = .66) and good at one and six months (Chronbach's alpha = .88 and .91, respectively).

Partner Compassion Scale (*PCS*; Gray, Cordova & Maher, 2015). The PCS is a 9-item scale of compassionate expressions demonstrated by partners. This measure was developed to measure the primary mechanism of compassionate understanding within the MC. Items are rated on a 0 (*never*) to 4 (*always*) Likert scale. Sample items include "when my partner sees that I am hurting, he/she tries to comfort me," "even when he/she is upset or angry, my partner tries to be careful with my feelings," and "even when we disagree, my partner can put him/herself in my shoes." In this sample, internal consistency was good at baseline, one month, and six months (Chronbachs alpha = .93, .94, and .95, respectively).

Communication Skills Test (CST; Saiz & Jenkins, 1996). The CST is 10-item scale measuring communication skills within intimate relationships. Items are rated on a 1(*almost never*) to 7 (*almost always*) Likert scale. Sample items include "I interrupt my partner when we are arguing" and "when discussing issues, I summarize what my partner says in order to make sure I understand him/her. Studies support the general reliability and validity of this measure (Stanley et al., 2001; Stanley et al., 2005). Reliability for the CST in the present study was good at baseline, one month, and six months (Chronbach's alpha = .84, .88, .86, respectively).

Center for Epidemiologic Studies Depression Scale - Short (CES-D 10). The CES-D

10 is a shortened version of the CESD -20 (Radloff, 1977) and has demonstrated consistency and reliability consistent with the CESD-20 (Andresen et al., 1994). The CESD measures symptoms of depression within the previous week and uses a scale ranging from 0 (*Rarely or none of the time; less than one day*) to 3 (*All of the time, 5-7 days*). Sample items include "I felt lonely," "my sleep was restless," and "I felt like I could not 'get going.'" The CESD demonstrated good reliability at baseline, one month, and six months (Cronbach's alpha = .83, .87, .87, respectively)

Couples Satisfaction Index-16 (CSI; Funk & Rogge, 2007). The CSI-16 is a self-report questionnaire that assesses relationship satisfaction. Items include "please indicate the degree of happiness, all things considered, of your relationship" which is rated on a scale from 1 (*extremely unhappy*) to 6 (*perfect*) and "in general, how satisfied are you with your relationship?" which is rated on a scale from 0 (*not at all*) to 5 (*completely*). Internal consistency of the CSI in the present study was high (Cronbach's alpha = .97 to .98 across follow-up).

Intimate Safety Questionnaire (ISQ; Cordova, Gee, & Warren, 2005**).** The ISQ is a 28-item measure of the degree to which partners feel safe being vulnerable with each other across several different domains of the relationship (Emotional Safety, Sexual Safety, Safety Disagreeing, Safety Being Yourself, and Safety in Public). The ISQ is a Likert-style scale rated from 0 (*never*) to 4 (*always*). Sample items include "I feel comfortable telling my partner when I'm feeling sad," "sex with my partner makes me feel uncomfortable," and "when I am with my partner I feel safe and comfortable." Internal consistency for the ISQ was good in the present study at all baseline, one month, and six months (Cronbach's alpha = .91, .93, .95, respectively).

Seeking Marriage Counseling Questionnaire. At the 6-month follow-up point, participants were asked if they had ever sought marital counseling from a number of specific sources (e.g., mental health clinical, primary care behavioral health provider, chaplain). Those

who endorsed seeking counseling via any of these methods were coded as “yes”, and otherwise coded as “no”. The seeking marriage help questionnaire is not the same as the original version reported in the registry. The questionnaire was expanded to include asking participants about the source of relationship help.

Intervention Procedures

The Checkup was conducted as a three-session intervention. Session One consisted of reviewing the couple’s relationship history and assessing their strengths as a couple. Session Two drew on techniques from Integrative Behavioral Couple Therapy (IBCT; Jacobson & Christensen, 1998) to address each partner’s primary relationship concern. Session three continued the therapeutic work and incorporated strategies from Motivational Interviewing (Miller & Rollnick, 2002) and was designed to 1) provide feedback to the couple based on the current literature 2) review a menu of research-based options for addressing their concerns and 3) work collaboratively with both partners to explore ways in which they can continue to take care of the health of their relationship. Follow up assessment questionnaires were administered at one month and six months following completion of MC session three, corresponding to medians of 78 days and 229 days, respectively, from the baseline assessment.. For a more complete description of the Checkup procedures please see Cigrang et.al, 2016.

Over the course of the study and across the five sites, there were a total of seven BHCs, both active duty and civilian contractors, who conducted the Checkups. Clinicians were all trained by the creator of the Checkup and received ongoing supervision throughout the intervention period. MC sessions were not recorded. BHCs were required to complete and sign a fidelity checklist for each session.

At the time of initial IRB approval for study start there were three data collection sites established (see Supplementary Table S2). The study relied on behavioral health consultants organic to the clinics to serve as study therapists. Each closure of a study site was a consequence of the therapist either resigning their position for reasons unrelated to the study, or changes in their workload that did not allow for time to continue serving as therapist on the study. When therapists resigned their position there was a lag in hiring a replacement and no guarantee that the replacement therapist would be interested in study participation. Sites were added to the study after study start in efforts to help meet target enrollment sample size. At the time of IRB closure of the protocol there were two sites participating in the study.

Statistical Analysis

This trial design assumed 20% attrition and was powered to detect a small effect (d = 0.23) on relationship satisfaction. We calculated that we would need 250 couples to achieve 80% power, accounting for clustering within-person and within couples.

The current trial resulted a in a 4-level data structure, with time-varying outcome measures (level 1) nested within individuals (level 2) nested within couples (level 3) nested within sites (level 4). To evaluate the effectiveness of the intervention, we used a 3-level multilevel model (Atkins, 2005), controlling for site-level clustering with fixed effects (McNeish & Stapleton, 2016). The combined equation was as follows:

$$\begin{aligned} Y_{tij} = \beta_0 + \beta_1(MC) + \beta_2(1\,month) + \beta_3(6\,months) + \beta_4(MC\ x\ 1\,month) \\ + \beta_5(MC\ x\ 6\,months) + \beta_6(Sex) + \beta_k(Site) \\ + \left[u_{0ij} + u_{0j} + u_{7j}(linear\ time) + e_{tij}\right] \end{aligned} \quad \text{(Eq. 1)}$$

This equation includes random intercepts at the individual and couple levels, and a random linear effect of time at the couple level. Because we anticipated nonlinear trajectories, we did not

include a fixed effect for linear time, but parameterized time-specific effects directly in the model using binary indicator variables (B_2, B_3), which represent the adjusted change from baseline at each time point. The test of intervention effectiveness, referred to as the *adjusted difference*, was modeled as a *treatment X time* interaction term at each wave (B_4, B_5) and represents differences in adjusted change between intervention groups. Note that the main effect of treatment was excluded because intervention status was randomized, causing the coefficients to represent adjusted differences in residualized change rather than raw change (Frison & Pocock, 1992). We controlled for main effects of sex and site. We also calculated the adjusted within-group change at each time point for each group (B_2 and B_3 taken directly from the model coefficients for the control group; $B_2 + B_4$ and $B_3 + B_5$ calculated using the delta method for the MC group,). We calculated Cohen's *d* effect sizes by dividing the intervention effect by the raw baseline standard deviation.

Moderation. Baseline severity was examined as a moderator of relationship satisfaction, the primary study outcome. We included continuous baseline relationship satisfaction scores (centered) and their time-specific interactions with intervention condition as predictors of 1-month and 6-month outcomes. In this model, the baseline scores were not included as within-person (level-1) repeated measures, and instead included as between-person (level-2) covariates. The main effect of treatment and the *treatment X baseline score* interactions represent the main and moderated effects of treatment at 1-month follow up, and the *baseline score X 6 month* and *treatment X baseline score X 6-month* interactions represent the differential effects between 1 and 6-months. We used the delta method to calculate the total MC vs. control contrast at 6 months.

Relationship help-seeking. Relationship help-seeking since beginning participation in the study was modeled using a 2-level model (individuals nested within couples) using a logit link function.

Missing data. This trial had two types of missing data. The first type of missingness was typical attrition, where both control (10%) and treatment couples (8%) did not complete 6-month follow-up questionnaires. The second type of missingness was pre-treatment dropout, where couples did not attend the intervention *and also* did not complete follow-up questionnaires (12 couples, 9.4% of treatment group). We used two complementary approaches to account for these two types of missingness.

To account for typical attrition, we used intention-to-treat analyses with full information maximum likelihood estimation, where all randomized couples were included in the analysis. Using full information maximum likelihood estimation, estimates are unbiased when reasons for missingness are included in the model (i.e., *missing at random*; Graham, 2009). Given the low attrition rate and that dropouts differed from completers only in relationship satisfaction which is included in the outcome model, this *missing at random* assumption appears reasonable. To account for pre-treatment dropout, we reweighted the model constraining the treatment effect for these pre-treatment dropouts to be zero (Hedeker & Gibbons, 1997). Thus, treatment estimates are unbiased conditional on the assumption that pre-treatment dropouts had equivalent trajectories to control couples with similar baseline scores. We examined the sensitivity of the primary outcomes to this assumption by estimating how effect sizes would differ depending on the true dropout trajectories.

Multiple comparisons. To adjust for multiple comparisons, we used the Benjamini-Hochberg (Benjamini & Hochberg, 1995) method with the false discovery rate set to 5%.

Results

Primary Outcome. Changes in the Couples Satisfaction Index were statistically significantly higher in the treatment group than the control group at 1 month (B = 4.1, $p < .001$; 95% CI, 1.9 to 6.1) and 6-month follow-up (B = 4.0, $p = .009$; 95% CI, 1.0 to 7.0; Figure 2 and Figure 3A), inclusive of adjustments for pre-treatment dropout. Delta method comparisons between the 1-month and 6-month effects indicated nonsignificant differences, implying that the treatment effect was sustained across the follow-up period (Supplementary Table 3). Notably, the average relationship satisfaction in the control group declined over time. Average treatment effects corresponded to a small effect size ($d = 0.27$; 95% CI, 0.07 to 0.47; Figure 2).

Secondary Outcomes. Treatment couples experienced statistically significant, small-to-moderate effect size improvements compared to the control group in all 5 secondary outcomes of responsive attention, partner compassion, intimate safety, communication skills, and depression at both 1- and 6-month follow-up (Cohen's *d* from 0.21 to 0.55; Figure 2).

A moderation analysis indicated that treatment effects were significantly higher for couples with lower baseline CSI scores (Figure 3B). The *Treatment X baseline CSI score* interaction (B = -0.16, SE = 0.07, $p = .021$) implied that individuals with scores 1 SD lower than the sample mean (i.e., a CSI-16 score of 47 points, or 4 points below the cutoff for relationship distress) experienced treatment effect sizes in the moderate range ($d = 0.51$; 95% CI, 0.26 to 0.75), whereas those at 1 SD higher than the mean experienced smaller positive effects ($d = 0.19$; 95% CI, 0.04 to 0.33). The *Treatment X baseline CSI score X 6-month* interaction indicated that the moderation effect at 6 months was nearly identical to the moderation effect at 1-month (B = 0.01, SE =0.11, $p = .96$).

Relationship Help-Seeking At 6-month follow-up, 31/195 (16%) individuals in the control group and 40/209 (19%) individuals in the treatment group reported seeking relationship help since beginning participation in the study. Relationship help-seeking was not significantly different across conditions (OR = 1.39; 95% CI, 0.51 to 3.83).

Discussion

This study examined the effectiveness of the MC when adapted for use in integrated primary care settings within the active-duty military system. Given the low rates of seeking and utilizing professional relationship treatment within the military (Snyder, et al., 2016), increasing access to care is a priority due to the variety of important health outcomes associated with ongoing relationship health.

The current study found that the MC was well-tolerated by active duty military couples, with 85% of couples in the treatment condition completing all three Checkup sessions. This in comparison to studies noting that 50%-80% of veteran couples initiating couple therapy in the VA system drop out before completion (Doss, Hsueh, & Carhart, 2011), and 43% of military couples fail to complete online relationship programs ePREP and OurRelationship (Georgia Salivar, et al., 2020). Ten couples were unable to complete their sessions due to the site closing, rather than lack of interest. Based on these retention numbers, as well as the participation of individuals across the range of couples satisfaction (from satisfied through distressed), evidence suggests that the brevity of the MC intervention, accessibility of care in a familiar setting, and the reduced stigma of working with a BHC may have successfully lowered barriers to treatment, demonstrating the potential utility of integrating the MC in primary care settings.

The results of this study provide evidence for the efficacy of the MC with military couples. Average effect sizes were in the .3 range for all relationship health variables, with

treatment couples showing positive effects of treatment at both 1 and 6 month follow-up. Additionally, moderation analyses revealed that couples with lower baseline relationship satisfaction experienced the largest treatment effects, suggesting that the MC is efficacious even with the most distressed couples. It should be noted, however, that ceiling effects for the most satisfied couples might also be driving some part of this moderation effect.

Notably, analyses also indicated a trend toward intimacy (and relationship satisfaction) deterioration over time for control group couples. This evidence is consistent with previous MC studies that have noted indicators of intimacy deterioration in control couples (e.g., Cordova et al., 2014, Trillingsgaard, et al., 2016). These data are in keeping with speculation that relationship health, and intimacy in particular, may be subject to a natural decay process that, in the absence of prevention and early intervention, tends to corrode relationship health over time. Additionally, though not a statistical trend (and remaining significantly healthier than their control group counterparts), there is also a noticeable decrease in all relationship health variables for treatment couples, from 1-month to 6-months. These accumulating findings may be notable for two reasons: 1) in keeping with a checkup model, they suggest that romantic relationships may require regular health maintenance, to arrest and reverse an otherwise natural vulnerability to health decline over time and 2) early prevention and intervention programs like the MC can be effectively applied to arrest the posited decay process. All checkup models are predicated on health systems' proclivity to decay and disease, and the possibility that such decay processes are a natural feature of long-term relationships may merit increased study.

It should be noted, however, that other studies have found evidence of spontaneous recovery in waitlist control couples (e.g., Doss, et al., 2020). One potential explanation for this difference may be the effect of variability in level of pre-intervention relationship distress. Our

sample included couples across the spectrum of distress, from more satisfied to more distressed couples, which would allow more readily for detection of relationship health deterioration. In contrast, previous study samples (e.g., Doss, et al., 2020) were skewed toward more distressed couples, which would predispose detection of spontaneous recovery, due in part to both floor effects and, arguably, regression to the mean. That noted, however, there is enough inconsistency in the literature, with some community-sample studies demonstrating relationship health deterioration over time (e.g., Lavner & Bradbury, 2010) and others demonstrating evidence of spontaneous recovery in waitlist samples (Barton, et al., 2021), that this phenomenon remains an area of ongoing study.

In addition to relationship satisfaction, the current study revealed positive effects on all secondary outcome variables, including partner responsiveness, compassion, communication, and intimacy. Analyses revealed that in comparison to controls, treatment couples experienced significant increases in partner responsiveness to bids for attention. Within the MC treatment rationale, the expectation is that therapeutic work to build intimacy bridges between partners out of increased mutual compassionate understanding of their most significant areas of concern should diminish the aversion leading to relationship withdrawal and hostile conflict, resulting in partners becoming more responsive to each other's bids for attention. Results also indicate that partners who had a Checkup reported experiencing greater compassion from their partner, in comparison to control couples. Central to the MC approach to treatment is the idea that the elicitation of partner compassion facilitates gains in partner acceptance, particularly around areas of concern and conflict. Treatment couples also reported increased communication skill. MC theory posits that partners' often have communication skills that they are not using, because those skills are suppressed or undermined by relationship withdrawal or problematic patterns

arising from emotional polarization around areas of conflict. Our results are consistent with speculation that suppressed communication skills will naturally reemerge as partners experience greater mutual compassionate understanding of their most significant relationship concerns. Finally, couples who received a Checkup reported feeling safer being their authentic selves with one another, indicating a greater sense of felt intimacy. Previous research has found support for our contention that intimacy and acceptance are the principal treatment mechanisms of the MC (Hawrilenko, Gray, & Cordova, 2016). MC treatment theory posits that felt intimacy is a significant component of overall relationship health, and the treatment model directly targets felt intimacy by eliciting partners' mutual compassion towards each other in the context of their most pressing relationship issues.

Participants who received a MC also reported significant decreases in depressive symptoms at both one month and six months post-MC. While this effect size was small, it is notable that a brief intervention primarily designed to improve overall relationship health, has predictable beneficial effects on self-reported depressive symptoms that are sustained over the course of six months. These findings are consistent with previous MC outcomes (Gray, Hawrilenko, & Cordova, 2020). One implication of these findings is that other important mental health domains can be effectively addressed as sequelae even when targeting relationship health exclusively. About one-fifth of participants sought out other relationship help during the time they were enrolled in the study. Contrary to our expectations, the MC did not result in a significant increase in help seeking relative to control condition participants.

Previous studies of relationship interventions with military/veteran couples have shown these interventions to be effective with regard to relationship outcomes (e.g., Doss et al., 2012) and individual functioning (e.g., PTSD; Monson, et al., 2012). The current study adds to the

existing literature evidence for the efficacy of a prevention and early intervention protocol tailored into existing behavioral health contexts for active duty couples, showing engagement across all levels of relationship satisfaction, high completion rates, and improvements in both relationship health and individual mental health.

One notable strength of this study includes its representative sample regarding demographic identities, military status, and rank. In particular the current sample is similar to the national census of race and ethnicity in America, and furthermore included active duty airmen ranging from Junior Enlisted through Commissioned Officers. The percentage in our study sample of enlisted personnel (79%) to officers (21%) compares favorably to the percentages in the Air Force population (81% and 19%) (Air Force Personnel Center, n.d.).

Limitations of the current study include limited long-term follow-up and evaluation of repeated annual Checkups. Previous studies have demonstrated an additional increase in relationship satisfaction, intimacy, acceptance, and responsive attention following a second annual Checkup (Cordova et al., 2014; Trillingsgaard & Fentz, 2016).

In addition, the study included only a small number of same-sex couples. Only 1.7% of participants were in a same-sex relationship, despite increased recruitment efforts to signify the MC as safe and affirming for all couples. This may indicate that further efforts are needed in order to reach same-sex couples. Historically, lesbian, gay, bisexual, and transgender (LGBT) individuals in the military (and same-sex couples) risked discharge if they served openly (Goldbach & Castro, 2016). To our knowledge, there are no published studies that have examined the relationship health of LGBT couples in the military. A recent study sampled LGBT and heterosexual individuals serving in the Army and found that LGBT Soldiers scored significantly higher on measures of psychological distress and suicidality when perceived

prejudice for the LGBT community was high (Conway, Dretsch, Taylor, & Quartana, 2020). Thus, it is likely that relationship health is even more difficult to maintain for LGBT couples in the military when the additional stressor of prejudice is present.

This research was designed to address the substantial need to lower barriers for military couples' relationship health help-seeking. Overall, results of this study suggest the adapted MC is an effective and accessible relationship intervention for military couples. The model fits well within an integrated primary care setting and the findings suggest that the Checkup offers a significant benefit to service members and their partners.

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Data Transparency Statement

(masked)