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Media Smart-Targeted: Diagnostic outcomes from a two-country pragmatic online eating disorder risk reduction trial for young adults

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Abstract

Background: Diagnostic outcomes in eating disorder (ED) risk reduction trials are important but rarely reported. **Methods:** An online pragmatic randomized-controlled trial was conducted with young-adult women in Australia and New Zealand seeking to improve their body image. *Media Smart-Targeted (MS-T)* was a 9-module program released weekly while control participants received tips for positive body image. Eating Disorder Examination–Questionnaire (EDE-Q) scores from baseline and 12-month follow-up were used to investigate two outcomes: ED onset in those who were asymptomatic at baseline (prevention effects); and, ED remission in those who met diagnosis at baseline (treatment effects). **Results:** *MS-T* participants were 66% less likely than controls to develop an ED by 12-month follow-up (non-significant). *MS-T* participants who met ED criteria at baseline were 75% less likely than controls to still meet diagnostic criteria at follow-up. This effect was significant and remained so for both those who did and who did not access external face-to-face ED treatment during the trial. **Conclusions:** Whilst further investigations are necessary, *MS-T* has fully automated procedures, low implementation costs, the potential to be delivered at-scale to assist those assist those where face-to-face services are limited or not available (e.g., remote areas).

Keywords: eating disorders; prevention; targeted; risk factors; online

Introduction

Eating disorders (ED: anorexia nervosa [AN], bulimia nervosa [BN] and binge eating disorder [BED], Other Specific Feeding and Eating Disorders [OSFED]) are serious problems, characterized by high mortality (Harris & Barraclough, 1998), a destructive physical and psychological course (Johnson, Cohen, Kasen & Brook, 2002), recent increases in prevalence rates (Hay, Mond, Buttner & Darby, 2008), low rates of presentation for treatment (Johnson et al., 2002), comparatively poor treatment outcomes (Steinhausen, 2002), high rates of relapse (Keel, Dorer, Franko, Jackson & Herzog, 2005), and high rates of health service use (Mond, Hay, Rodgers & Owen, 2007). In Australia alone, 913,000 people were suffering from an ED in 2012 where the estimated socioeconomic costs were $AUD69.7 billion ($US52.9 billion: Butterfly Foundation, 2012). Thus while the pursuit of effective ED prevention and treatment is of critical importance, it is equally important that this be available in a manner that can be delivered at-scale to meet this overwhelming need that cannot possibly be met by traditional services. To date, two face-to-face programs (*The Body Project* and *Healthy Weight*) have been found to reduce the onset of EDs while an online program (*Student Bodies)* has been found to reduce onset for sub-populations such as participants with elevated BMI at baseline (Stice, Marti, Spoor, Presnell & Shaw, 2008; Taylor et al., 2006).

The purpose of this report is to examine whether *Media Smart-Targeted* (*MS-T*) can decrease EDs in young-adult women relative to a control condition. *MS-T* is an online adaptation of *Media Smart*, a school program that has been found to significantly reduce a range of ED (and obesity) risk factors in young-adolescent girls and boys (Wilksch et al., 2015; Wilksch & Wade, 2009), significantly reduce growth in girls' shape and weight concerns over a 2.5-year follow-up (Wilksch & Wade, 2009), and halve the rate of onset of clinically-significant shape and weight concerns at 12-month follow-up (Wilksch et al., 2015). This online intervention was not moderated, so it was different form previous targeted prevention trials shown to decrease EDs; most of the previous trials were conducted at university sites with monitoring from a therapist moderator (e.g., Taylor et al., 2006), or conducted face-to-face (Stice et al., 2008). Whilst the school version of *Media Smart* is a universal program (e.g., all girls and boys in school classes included regardless of baseline levels of ED risk), *MS-T* was developed as a targeted (i.e., 'indicated') program (e.g., participants included due to elevated baseline ED risk or already reporting disordered eating behaviours). Other targeted trials have understandably excluded those meeting ED diagnosis at baseline (Stice et al., 2008; Taylor et al., 2006), while some

have also excluded those meeting subclinical ED diagnosis or having previously accessed ED treatment (Taylor et al., 2006).

A recent two-country randomized controlled trial (RCT; *N*=575) of *MS-T* focused on outcomes related to measures of continuous disordered eating (global EDE-Q score), ED risk factors, and presence/absence of disordered eating over a 12-month follow-up (Wilksch et al., 2017). This trial was pragmatic in nature, meaning we sought to evaluate how the program would be used and its effectiveness under real-world conditions; at-scale across two countries with minimal exclusion criteria (Ford & Norrie, 2016). Individuals self-referred based on wishing to improve body image, where the only exclusion criteria were: elevated suicide risk; alcohol or substance abuse; or, self-reported BMI < 15.0. At baseline, 76% of the sample met criteria for disordered eating, defined as having a global EDE-Q score ≥ 1 SD of the community mean (i.e., M=2.46: Mond, Hay, Rodgers, Owen & Beumont, 2004), in addition to a minimum of one of the following in the previous 4-weeks: fasting; vomiting; or laxatives to control weight; objective binge eating episode; or BMI <18.5. Despite this high proportion of eating pathology, just 14.7% of the sample endorsed having received treatment in the last 12 months for ED symptoms. As such, one of the strengths of this trial was the inclusion of many young women who were experiencing eating pathology who were not currently receiving care for these symptoms.

Analyses were conducted in two ways (Wilksch et al., 2017): Intention-to-treat (ITT); and, 'measure completers', referring to the 78% of the sample who completed who completed baseline and a minimum of one other assessment point. ITT analyses revealed *MS-T* participants had significantly higher quality of life–mental relative to controls, while amongst measure completers *MS-T* scored significantly lower than controls on: EDE-Q global; media internalization; depressive symptoms; ineffectiveness; and, clinical impairment. Of those with baseline DE, *MS-T* participants were significantly less likely than controls to still have disordered eating at 12-month follow-up. Whilst program completion rates were low (13.6%), 41.2% (26/63) of those who completed the first module completed all modules.

The aims of this research were to investigate the efficacy of *MS-T* with regard to clinical (or diagnostic) outcomes – namely prevention effects (outcomes for those who did not meet ED diagnosis at baseline) and treatment effects (outcomes for those who met ED diagnosis at baseline). This responds to the calls for ED prevention scientists to give greater attention to the assessment and reporting of clinical outcomes in risk reduction trials (Becker, 2015).

Methods

Participants

Full information regarding recruitment, randomization and procedures appears in a separate report (Wilksch et al., 2017). In brief, eligible participants were young-adult women (18-25 years) seeking to improve their body image from across Australia and New Zealand. Self-referral was used with sources including: flyers at universities (*n*=100; 31.9%); social media (*n*=87; 27.8%); and, media reports (*n*=60; 19.2%).

Program & Procedure

A full description of the 9-module *MS-T* program has been reported (Wilksch et al., 2017). Program content addresses prospectively identified ED risk factors (e.g., media internalization). Modules were released weekly and participants were encouraged to view interactive content, provide responses to questions, and complete homework assignments. Whilst *MS-T* was developed based on *Media Smart* (8-lesson school version), content was changed considerably to be appropriate for a young-adult, online, female-only audience. New content included a greater focus on social media pressures; emotion regulation; goal setting and a module to address eating-related risk factors was included (e.g., the importance of eating breakfast and regular eating). Consistent with other targeted trials, control participants received a one-off email providing tips for positive body image (e.g., Stice *et al.*, 2011).

Procedure

The study website provided participants with information, consent procedures, and baseline questionnaires. Following questionnaire completion, the website automatically randomized participants to condition with *MS-T* participants were able to access their website immediately. Automated email reminders were sent to all participants to complete post-program measures 10-weeks after baseline and at 6- and 12-month follow-up. A $AUD50 gift voucher was sent to participants who completed a minimum of three waves of assessment. Ethics approval for this research was received from the Flinders University Social and Behavioural Research Ethics Committee.

Measures

ED diagnosis was assessed using the Eating Disorder Examination Questionnaire (EDE-Q: see **Table 1)**. A systematic review concluded there was "data to support the ability of scores on the

EDE-Q to differentiate between cases and non-cases of eating disorders" (p. 436: Berg, Peterson, Frazier & Crow, 2012). The EDE-Q has been validated against the EDE interview, demonstrating moderate diagnostic concordance (Berg et al., 2012). Whilst the interview is superior with respect to diagnosis, the EDE-Q has been used to generate diagnosis in a young-adult Australian outpatient sample (Mancuso et al., 2015) and use of the EDE-Q was well-suited to the pragmatic approach to this research.

Statistical Analyses

The baseline frequencies of ED cases between conditions were investigated using Chi Square analyses. Both prevention and treatment outcomes were investigated for those who completed measures at 12-month follow-up (*N*=205; 64.8% of baseline sample). Odds ratios (OR) and 95% CI from logistic regressions were used to compare diagnostic status at 12-month follow-up for *MS-T* participants relative to controls. These analyses were also conducted adjusting for receiving face-to-face treatment (e.g., psychologist, psychiatrist) at any point in the trial.

Results

Participants

Data that are relevant for the current report come from *N*=316 women (*M* age=20.80 years, *SD*=2.26). This group was comprised of all control participants (*n*=194) and *n*=122 *MS-T* participants (63.8%) who accessed the program at least once out of the 194 participants who were allocated to *MS-T*. Of this sample, a total of *n*=220 participants (69.6%) met criteria for ED at baseline. The proportion of these cases was not significantly different between the *MS-T* (n=90; 73.8%) and control conditions (n=130; 68.1%: $\chi^{(1)}$=1.16, p = .281.)

Prevention effects

Of the participants with 12-month follow-up data, *n*=15 met ED criteria who did not meet ED at baseline (*n*=66). **Table 2** shows that *MS-T* participants were 66% less likely than controls to develop an ED by 12-month follow-up. Amongst those who did not seek external treatment during the trial, *MS-T* participants were 52% less likely than controls to meet ED diagnosis at 12-month follow-up. These results were not significant.

Treatment effects

Of the participants with 12-month follow-up data, *n*=37 participants no longer met ED criteria who did meet criteria at baseline (*n*=117). **Table 2** shows *MS-T* participants were 75% less likely than

controls to meet ED criteria at 12-month follow-up. This finding was also significant amongst both non-treatment seekers and treatment seekers, where *MS-T* participants were 71% and 86% less likely than their controls to meet diagnosis at 12-month follow-up.

To investigate this further, logistic regressions were run separately by ED diagnoses. A significant treatment effect was found for OSFED cases (OR=0.37, 95% CI [0.14-0.98]), where *MS-T* participants (17/27:63.0%) were 63% less likely than controls (19/49: 38.8%) to meet diagnosis at follow-up. This finding was also significant for those participants who did not access external face-to-face treatment during the trial cases (OR=0.32, 95% CI [0.11-0.95]). Due to low numbers, AN, BN and BED were combined to form one omnibus outcome. Of these cases, a higher proportion of *MS-T* participants (10/15: 66.6%) no longer met diagnosis at 12-month follow-up than controls (19/44: 43.2%), however this was not significant (OR=0.38, 95% CI [0.11-1.30]).

Discussion

This trial investigated the impact of *MS-T* on ED diagnosis onset and remission in an online pragmatic RCT involving a community sample of self-referred young-adult women wishing to improve their body image. Minimal exclusion criteria were used. Two key findings emerged. First, a treatment effect was found where *MS-T* significantly reduced the likelihood of continuing to meet diagnosis at 12-month follow-up. This was observed both for those who did, and did not, seek external face-to-face ED treatment. This finding extends the original RCT report, which also found a treatment effect for participants meeting more broad disordered eating criteria (Wilksch et al., 2017). Post-hoc analyses revealed a significant effect specifically for OSFED cases, which might be related to the higher frequency of these cases compared to AN, BN and BED. Further, whilst OSFED causes significant suffering in its own right, it is possible that *MS-T* prevented a proportion of these cases from 'progressing' to one of the other diagnoses. To achieve this without participants requiring face-to-face treatment is a promising finding that warrants further investigation.

To the best of our knowlege, this was the first time a targeted program has resulted in a significant treatment effect using diagnostic outcomes. Some previous studies have achieved reductions in disordered eating behaviours in participants with subthreshold eating disorder symptoms, but excluded those meeting full syndrome diagnoses (Jacobi, Völker, Trockel & Taylor, 2012; Saekow et al., 2015). Whilst it is not suggested that *MS-T* is comparable to established ED treatment protocols, the program is well-suited to clinical samples given *MS-T* is online and does not include open

discussion groups. Thus participants of varying ED risk levels can participate in *MS-T* without risk of causing inadvertent harm to other participants given that participant responses are not shared.

Second, whilst not significant, *MS-T* participants were two thirds less likely than controls to become a new ED case by 12-month follow-up. This finding is encouraging and similar to that found for face-to-face delivery of *Healthy Weight* (61%) and *The Body Project* (60%), though these findings were based on interview over a 2-3 year follow-up (Stice et al., 2008). This lack of significance is likely due to the comparatively small proportion of participants who did not meet ED criteria at baseline. Given *MS-T* was originally developed as a targeted risk reduction program, it would be valuable for furture research to focus on recruiting a non-clinical sample to more fully assess *MS-T*'s impact as a prevention program.

The limitations of this research have been previously outlined (Wilksch et al., 2017). Of relevance to this report includes: the use of self-report rather than interview to assess ED symptoms; the 28-day time frame of EDE-Q assessment rather than the 3-month timeframe used with the EDE; and, measure completion rates being lower than other targeted prevention trials where this was exacerbated by use of online self-report assessment. Power analyses were conducted for continuous outcomes reported in the primary RCT (Wilksch et al., 2017), thus findings for dichotomous outcomes presented need to be interpreted with caution and require replication.

Whilst replication trials are required, *MS-T* holds promise as a program that to date has been found to: reduce ED onset by two thirds; be effective at significantly reducing eating pathology for those with baseline ED symptoms; and, which seems to augment rather than confound external treatment. Given the low implementation costs of *MS-T* where it is of a 'pure' self-help nature with fully automated registration and access procedures, the program has potential to be delivered at-scale to assist those where face-to-face services are limited (e.g., long waiting lists), not available (e.g., remote areas), or where individuals are reluctant to attend face-to-face services. At the population level, this is likely to be a vast number of people where currently only a fraction are receiving the help that they need. Finally, it is of interest that while *Media Smart* and *MS-T* sit at opposite ends of the prevention spectrum (i.e., universal – targeted), both have achieved reductions in ED risk or symptoms through encouraging participants to question the validity of media (and other) messages that suggest our self-worth should be primarily determined by perceptions of our appearance, shape and weight.

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Declaration of Interest: Dr Wilksch and Professor Wade are authors of *Media Smart-Targeted* and *Media Smart*, where sales of *Media Smart* fund further ED prevention research.

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Table 1.

Diagnosis, description of criteria for diagnosis, baseline frequencies of various diagnoses for MS-T and controls

Diagnosis	*MS-T* *N=122* n *(%)*	Controls *N=194* n *(%)*	Description
AN	7 (5.7)	9 (4.7)	BMI < 18.5; AND fear of gaining weight OR persistent behaviour that interferes with weight gain (fasting / vomiting / laxatives >4); AND at least moderate importance of shape and/or weight OR felt fat for more than half of the days (>= 4)
BN	11 (9.0)	19 (9.8)	Objective bulimic episodes (OBE) at least once per week over past 28-days; AND compensatory behaviours fasting / vomiting / laxatives) at least once per week over past 28-days; AND at least moderate importance of shape and / or weight (>= 4); AND did not occur during an episode of AN
BED	18 (14.8)	37 (19.2)	OBE at least once per week over past 28-days; AND did not occur during an episode of other diagnosis
OSFED	54 (44.3)	65 (33.7)	Mean item EDE-Q global score >= 2.46 (i.e., global EDE-Q score ≥ 1 SD of the community mean (Mond et al., 2004) AND presence of one or more of the following: OBE; fasting; vomiting; laxative use; BMI< 18.5 AND did not meet diagnosis for AN, BN, or BED
ED	90 (73.8)	130 (68.1)	Combined total of above 4 diagnoses

Note: AN= anorexia nervosa; BN= bulimia nervosa; BED= binge eating disorder; OSFED= other specific feeding and eating disorder; ED= eating disorder

Table 2.

Prevention and treatment effects for clinical eating disorder cases at 12-month follow-up (significant results are bolded)

Analysis	*MS-T* N (%)	Control N (%)	OR (95% CI) MS vs control
Prevention effects			
1. Not adjusting for treatment	2/18 (11.1)	13/48 (27.1)	0.34 (0.07-1.67)
2. Adjusting for treatment			0.48 (0.09-2.56)
- No treatment	2/18 (11.1)	8/39 (20.5)	0.48 (0.09-2.56)
-Yes treatment	0 (0)	5/9 (55.6)	-
Treatment effects			
1.Not adjusting for treatment	20/42 (47.6)	17/75 (18.5)	**0.25 (0.11-0.56)**
2. Adjusting for treatment			**0.25 (0.11-0.56)**
- No treatment	15/33 (45.5)	14/72 (19.4)	**0.29 (0.12-0.79)**
- Yes treatment	5/9 (55.6)	3/20 (15.0)	**0.14 (0.02-0.85)**

Note: [a] proportion per condition of new clinical eating disorder cases at 12-month follow-up: only participants who did not have ED at baseline; [b] proportion per condition of no longer being a clinical eating disorder case: only participants who did have ED at baseline. Bolded values indicate significant odds ratios ($p<.05$).