An online healthy relationship tool and safety decision aid for women experiencing intimate partner violence (I-DECIDE): a randomised controlled trial

Kelsey Hegarty, Laura Tarzia, Jodie Valpied, Elizabeth Murray, Cathy Humphreys, Angela Taft, Kitty Novy, Lisa Gold, Nancy Glass

Summary

Background Evidence for online interventions to help women experiencing intimate partner violence is scarce. We assessed whether an online interactive healthy relationship tool and safety decision aid (I-DECIDE) would increase women's self-efficacy and improve depressive symptoms compared with an intimate partner violence information website.

Methods In this two-group pragmatic randomised controlled trial, we enrolled women who had screened positive for any form of intimate partner violence or fear of a partner in the 6 months before recruitment. Women aged 16–50 years currently residing in Australia, who had safe access to a computer and an internet connection, and who answered positively to one of the screening questions in English were eligible for inclusion. Participants were randomly assigned (1:1) by computer to receive either the intervention or control website. The intervention website consisted of modules on healthy relationships, abuse and safety, and relationship priority setting, and a tailored action plan. The control website was a static intimate partner violence information website. As the initial portion of the website containing the baseline questions was identical for both groups, there was no way for women to tell which group they had been allocated to, and the research team were also masked to participant allocation until after analysis of the 12-month data. Data were collected at baseline, immediately after completion of the website, at 6 months, and 12 months. Primary outcomes were mean general self-efficacy score (immediately after website completion, and at 6 months and 12 months) and mean depression score (at 6 months and 12 months). Data analyses were done according to intention-to-treat principles, accounting for missing data, and adjusted for outcome baseline scores. This trial was registered with the Australian New Zealand Clinical Trials Registry, ACTRN 12614001306606.

Findings Between Jan 16, and Aug 28, 2015, 584 patients registered for the study and were assessed for eligibility. 422 eligible participants were randomly allocated to the intervention group (227 patients) or control group (195 patients). 179 (79%) participants in the intervention group and 156 (80%) participants in the control group completed 12-month follow-up. Mean self-efficacy at 6 months and 12 months was lower for participants in the intervention group than for participants in the control group, although this did not meet the prespecified mean difference (6 months: 27·5 [SD 5·1] *vs* 28·1 [4·4], imputed mean difference 1·3 [95% CI 0·3 to 2·3]; 12 months: 27·8 [SD 5·4] *vs* 29·0 [5·0], imputed mean difference 1·6 [95% CI 0·5 to 2·7]). We found no difference between groups in depressive symptoms at 6 months or 12 months (6 months: 22·5 [SD 17·1] *vs* 24·2 [17·2], imputed mean difference –0·3 [95% CI –3·5 to 3·0]; 12 months: 21·9 [SD 19·3] *vs* 21·5 [19·3], imputed mean difference –1·9 [95% CI –5·6 to 1·7]). Qualitative findings indicated that participants found the intervention supportive and a motivation for action.

Interpretation Our findings highlight the need for further research, development, and refinement of online interventions for women experiencing intimate partner violence, particularly into the duration needed for interventions. Although we detected no meaningful differences between groups, our qualitative results indicated that some women find an online tool a helpful source of motivation and support.

Funding Australian Research Council.

Lancet Public Health 2019; 4: e301–10

See **Comment** page e270

Department of General Practice (Prof K Hegarty PhD, L Tarzia PhD, J Valpied MEd, K Novy RN) **and Department of Social Work** (Prof C Humphreys PhD), **The University of Melbourne, Melbourne, VIC, Australia; The Royal Women's Hospital, Melbourne, VIC, Australia** (Prof K Hegarty); **eHealth Unit, Department of Primary Care and Population Health, University College London, London, UK** (Prof E Murray PhD); **Judith Lumley Centre, La Trobe University, Melbourne, VIC, Australia** (Prof A Taft PhD); **Department of Population Health, Deakin University, Melbourne, VIC, Australia** (L Gold PhD); **and School of Nursing, Johns Hopkins University, Baltimore, MD, USA** (Prof N Glass PhD)

Correspondence to:
Prof Kelsey Hegarty, Department of General Practice, The University of Melbourne, Melbourne 3010, VIC, Australia
k.hegarty@unimelb.edu.au

Introduction

Intimate partner violence is prevalent globally, affecting around a third of women worldwide.[1] Intimate partner violence is defined as physical, psychological, financial, or sexual harm perpetrated by one intimate partner against another.[1] Such violence is associated with a range of negative mental and physical health outcomes,[1] with WHO emphasising the importance of effective interventions in health and community settings to support women experiencing intimate partner violence.[2] Although woman-centred counselling interventions have shown promise,[3] several barriers might prevent women disclosing intimate partner violence face to face. These barriers include fear of the abusive partner,

Research in context

Evidence before this study

We did a systematic review of interventions delivered online for women experiencing intimate partner violence. On Aug 28, 2018, we searched the online databases MEDLINE, Scopus, CINAHL, PsycINFO, and the Cochrane Library for randomised controlled trials with the search terms "domestic violence", "partner violence", "domestic abuse", "partner abuse", "spousal abuse", "marital violence", "abused women", "online", "internet", "web", "computer", "digital", "mobile", "ehealth", "mhealth", "support", "help", "intervention", or "tool" with no restrictions on publication date or language. We excluded studies if the intervention was not delivered entirely online or did not target female victims or survivors of intimate partner violence. Our search identified four randomised controlled trials that described three interventions. Most of the studies had a low risk of bias. All included studies reported that online interventions were feasible and acceptable to women experiencing intimate partner violence. An online, interactive decision aid from the USA (IRIS—Internet Resource for Intervention and Safety) was found to reduce women's relationship decisional conflict (feelings of conflict about what to do about their relationship) after a single use and increased the number of safety strategies that women found helpful at 12 months when compared with a standard website. Another online interactive decision aid from New Zealand (iSAFE), which built on the IRIS intervention, did not reduce intimate partner violence exposure at 6 months and 12 months (except for a subgroup of Maori women only) nor depressive symptoms at 3 months compared with a standard website. Participant numbers in a low-quality pilot study comparing email with face-to-face delivery of an intervention that comprised six weekly modules (educational content, information, and assessments) precluded conclusive outcomes. Thus, previous evidence suggests some positive findings on help seeking, but no effect on depression or intimate partner violence, except for in certain subpopulations.

Added value of this study

To our knowledge, this is the first rigorous randomised controlled trial in a high-income country (Australia) that has assessed an online intimate partner violence intervention for its effect on self-efficacy, depression, fear, and helpful actions taken up to 12 months post-exposure, and we found that the intervention was not effective. Our study is also the first, to our knowledge, to evaluate a combined online healthy relationship tool and safety decision aid for women experiencing intimate partner violence. Our findings will help inform development of future interventions in this area, as well as contributing to the debate around meaningful outcomes for intimate partner violence trials.

Implications of all the available evidence

Evidence to date suggests that in the general population, online interactive intimate partner violence interventions are no more effective than static intimate partner violence websites in reducing women's exposure to violence or victimisation, improving mental health symptoms, or strengthening self-efficacy. However, these interventions are acceptable to women and can be safely used. There is a small amount of evidence that online decision aids can reduce decisional conflict, but how useful this outcome is for women remains to be elucidated. Further research is urgently needed into meaningful outcomes and helpful components in online intimate partner violence trials.

embarrassment, or the belief that intimate partner violence is a private issue.[2]

Web-based interventions for women experiencing intimate partner violence have been suggested as an alternative to traditional face-to-face approaches that might overcome some of these barriers to seeking help.[4] An intervention delivered via the internet can be accessed privately, at a time convenient to a woman,[5] without the need to disclose to anybody that she is experiencing violence until she is ready to do so. The internet is increasingly being harnessed as a method of delivery for interventions to address sensitive, stigmatising conditions,[6] including mental and sexual health issues, which suggests that it could also be useful in the field of intimate partner violence. However, little research has explored this possibility. Qualitative work with women who have experienced intimate partner violence suggests that websites and mobile device applications are an acceptable way to raise awareness and provide support;[5] however, there has been a paucity of robust evidence to support their effectiveness.

Four online interventions for intimate partner violence have been evaluated via randomised controlled trials, with mixed results.[7–10] Two studies evaluated the effectiveness of an online safety decision aid intervention for women experiencing intimate partner violence: the Internet Resource for Intervention and Safety (IRIS) project in the USA[7,8] and the iSafe project in New Zealand.[9] The IRIS and iSafe interventions were informed by Dutton's empowerment model[10] and focused on reducing women's decisional conflict about whether to stay in or leave a relationship, increasing safety behaviours, improving mental health, and reducing violence. The IRIS trial found that participants receiving the intervention felt more supported and had less decisional conflict about safety after only a single use, and reported a greater increase in the number of safety behaviours that were helpful over a 12-month period compared with control participants.[8] In a subgroup of Maori women only, the iSafe study[9] found a reduction in intimate partner violence at 6 months and 12 months and fewer depressive symptoms at 3 months. Subsequent work in Canada[11] used similar processes and

outcomes to the USA and New Zealand trials, but the findings have not yet been published.

Building on these international findings[8,9] and our previous face-to-face counselling work,[3] we developed an online healthy relationship tool,[4] known as I-DECIDE, which included a safety decision aid section. We drew on a different theoretical framework[4] to the safety decision aids by using the Psychosocial Readiness Model,[12] which suggests that if women are more aware and have more perceived support and self-efficacy, they are able to take action and change their situation. I-DECIDE aims to help women self-inform, self-reflect, and self-manage, and focuses more on healthy relationships, rather than only safety decisions. This intervention adds to the online counselling techniques of motivational interviewing and non-directive problem solving,[3] and also provides messaging tailored to each woman's individual situation (eg, level of intimate partner violence and danger, and whether the woman has children) and an individualised plan of action that is responsive to a woman's priorities and plans for her relationship (staying or leaving) and location.

We hypothesised[4,13] that women using I-DECIDE would primarily experience increased self-efficacy and reduced depressive symptoms compared with women using a non-interactive, information-only, static control website representing usual care. Our secondary hypotheses were that women using I-DECIDE would engage in more actions for safety and wellbeing and have lower levels of fear of their abusive partner compared with those using the control website. In this Article, we report the main findings of this trial at 6-month and 12-month follow-up.

Methods

Study design and participants

In this two-group pragmatic randomised controlled trial, we enrolled women who had screened positive for any form of intimate partner violence or fear of a partner in the 6 months before recruitment. Women aged 16–50 years currently residing in Australia, who had safe access to a computer and an internet connection, and who answered positively to one of the screening questions in English were eligible for inclusion. The screening questions asked whether in the last 6 months a woman's partner or ex-partner had made her feel afraid or unsafe; followed her or harassed her over the telephone or online; called her names, humiliated, bullied, or criticised her, or threatened her in any way; isolated her from her family and friends or restricted her behaviour in any way; physically harmed her in any way; or forced her to do sexual things she did not want to do. Women were also required to provide a current valid email address, their name, and an Australian residential address for validation purposes. As an additional safety measure and way of reducing participant attrition, telephone numbers for two safe alternative contacts were requested during sign-up.

Study recruitment was done online via targeted, carefully worded advertisements across a range of platforms, including Facebook and Twitter. Methodological and ethical considerations associated with this approach have been described elsewhere.[14] Participants gave informed consent for participation via an online form and were compensated for their time up to AUS$150 depending on how many surveys they answered.

This trial conforms to the CONSORT-EHEALTH guidelines.[15] Ethics approval was obtained from The University of Melbourne's Human Research Ethics Committee. Methods are described in detail in our study protocol.[13]

Randomisation and masking

Once women were enrolled in the study, they were randomly assigned by computer to the intervention or control group. An automated, computerised algorithm for simple 1:1 randomisation was used, with no stratification. As the initial portion of the website containing the baseline questions was identical for both groups, there was no way for women to tell which group they had been allocated to. Women were masked to treatment allocation, although it is possible that some may have guessed which website they were receiving. All the research team were masked to participant allocation until after analysis of the 12-month data.

Procedures

Women who clicked on a study advertisement were directed to the trial website where they could receive further information about the study and sign up. Once a participant signed up, they were sent an automated email containing a link to the baseline survey and a unique username and password. After logging in and completing the baseline survey, participants were automatically presented with either the intervention (I-DECIDE) or control website, depending on which group they had been randomly allocated to. Participants could complete the surveys and website on a computer, tablet, or smartphone, in any setting, although they were encouraged to do so in a place where they felt safe.

We drew on the Psychosocial Readiness Model[12] when developing the intervention and our theory of change is detailed elsewhere.[4] On the intervention website, participants were presented with an initial Help Me Decide screen, which provided a choice of three modules addressing healthy relationships, safety, and priorities (appendix p 1). The safety and priorities modules were compulsory because the information was used to tailor the action plan the woman received at the end of the session. The healthy relationships module provided information about healthy relationships and asked a woman to indicate on a sliding scale from 0 to 10 how healthy she believed her own relationship to be, her current level of fear in the relationship, and her current

See Online for appendix

level of safety. The safety and abuse module contained questions from the Composite Abuse Scale (CAS)[16] and Danger Assessment,[17] which have been validated and are used to determine a woman's level of abuse and risk of severe violence or homicide, respectively. Women received tailored messaging depending on their responses (appendix p 2). The priorities module enabled women to weigh up five different areas by comparing different pairings of the following: concern for safety, health and wellbeing, having resources, and feelings for the partner (children's wellbeing was added if the woman had children). An algorithm was used to calculate the woman's top priority and provided messaging to reflect her choice, similar to the IRIS and iSafe interventions.[8,9]

At this point, a woman's awareness of abuse and readiness for action was assessed by use of a modified version of the Contemplation Ladder.[18] Women who indicated that they were aware of the abuse or ready to make changes in their relationship were directed straight to the action planning module. Women whose answers indicated ambivalence to change or a lack of awareness about the abuse they were experiencing were first directed to a motivational interviewing module. By use of motivational interviewing techniques that worked with women's ambivalence, this self-reflection exercise aimed to help women weigh up the pros and cons of their relationship.[19]

The final element of the I-DECIDE website was an individualised action plan (appendix p 2), which consisted of five potential actions for safety and wellbeing tailored to a woman's top priority identified during the previous module, her intention for the relationship (stay, leave, or already left), whether she had children, and the postcode of her residential state. The only exceptions to this rule were women who scored highly on the CAS or the Danger Assessment, who received an emergency safety plan before their top five strategies. At any point, women could also choose to view all the strategies in the database. Alongside the action plan was a non-directive problem-solving exercise that asked women to choose one of the strategies from their action plan and work through any perceived barriers to enacting it. During piloting, the website took between 30 min and 60 min for a woman to work through, depending on her responses.

Women in the control group received a static website (5-min duration) developed for this project, which contained brief information about domestic violence (appendix p 2) and a standard emergency safety plan as per standard practice in the intimate partner violence sector in Australia. The emergency safety plan was in the same format as that delivered to women in the intervention group who scored highly on the Danger Assessment or the CAS.

After completion of their 12-month session, all women were invited to participate in a short follow-up process evaluation interview. This timing was chosen to ensure that the interviews did not affect the study outcomes. Interviews were semi-structured in nature and were conducted via telephone by a trained research assistant. The purpose of the process evaluation interview was to help us understand which parts of the intervention were effective and why, to provide insight into how women's experiences differed between the intervention and control websites, and to assess women's experiences of taking part in the trial. We analysed interview data regarding the differences between intervention and control websites with a deductive thematic approach,[20] using our previously developed causal pathways model[4] as a framework. The views of women in both the intervention and control groups were contrasted considering the intended goals of the website (to increase awareness, self-efficacy, and perceived support, with a follow-on improvement in mental health and enhanced safety strategies).

Outcomes

The primary outcomes were self-efficacy (measured with the Generalized Self-Efficacy Scale[21]) and depression (measured with the Center for Epidemiologic Studies Depression Scale—Revised[22]). Secondary outcomes were fear of partner (measured by a visual analogue scale ranging from 0 [not afraid at all] to 10 [very afraid]), number of helpful behaviours for safety and wellbeing, and cost-effectiveness. Detailed cost-effectiveness data are not presented in this Article. Other variables investigated were sociodemographics, amount of intimate partner violence (assessed by CAS[16] and Danger Assessment[17]); harm (measured by items from the Consequences of Screening Tool[23]); social support (assessed with the Medical Outcomes Survey—social support[24]); and health service use and life events (measured by the Diamond life event questionnaire, taken from the Diamond longitudinal depression study[25]).

Data were collected online immediately after completion of the I-DECIDE or control website, and at 6 months and 12 months. An electronic participant database automatically sent women email prompts at 6 months and 12 months with a link to the corresponding version of the website. Women were asked to log in again with their existing username and password to complete their survey questions. After they had completed the assessment measures, they were given the option to complete the intervention or control modules again, or to skip to the end of the website.

Statistical analysis

We aimed to enrol 404 eligible women at baseline to allow for attrition of 30% by 12 months, meaning a final sample size of 141 women in each group needed to detect a significant difference between the groups for the primary outcomes, with at least 80% power (α=5%, two-sided test). We hypothesised a difference of at least a third of an SD between the two groups immediately after the intervention for self-efficacy, and at 6 months and

12 months for self-efficacy and depression. This hypothesised difference was based on the results of a previous study[3] that used a counselling intervention with women experiencing intimate partner violence and would infer a favourable outcome for around 10% more intervention recipients than control recipients, assuming at least 20% of control recipients also improved on self-efficacy and depression outcomes.[26]

We used descriptive statistics to summarise women's characteristics and outcomes at baseline, 6 months, and 12 months by study group. Self-efficacy and number of helpful activities followed a relatively normal distribution, whereas depression and fear of partner were slightly positively skewed. We used mixed effects linear regression with robust SEs, with study group fitted as a fixed effect and change over time within groups fitted as random effects. Both the main and imputed data analyses were done according to intention-to-treat principles. For the main analyses, we included all available data from all participants who had completed baseline, regardless of whether they had completed the treatment phase (completion of the intervention or control website) and whether they had completed all follow-up timepoints. For the imputed analyses, we used multiple imputation by chained equations to estimate the values of missing outcome data (we generated 100 imputed datasets). The imputation model included treatment group, baseline variables found to be predictive of missingness on the outcome variables, and baseline and immediate follow-up variables found to be predictive of non-missing values on the outcome variables (appendix p 3). Baseline variables found to be predictive of missingness were age, relationship status, whether the woman had a child, sex of the perpetrator of violence, employment or student status, birth outside Australia, non-urban location, negative important life event experienced in past 6 months, level of social support or perceived level of support from the website, and type of device used to complete website (appendix p 4).

All statistical analyses reported were prespecified and done using Stata (version 14).

The trial is registered with the Australian New Zealand Clinical Trials Registry, ACTRN 12614001306606, and the protocol has been previously published.[13]

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Between Jan 16, and Aug 28, 2015, 584 patients registered for the study and were assessed for eligibility (figure). 422 eligible participants were randomly allocated to the intervention group (227 patients) or control group

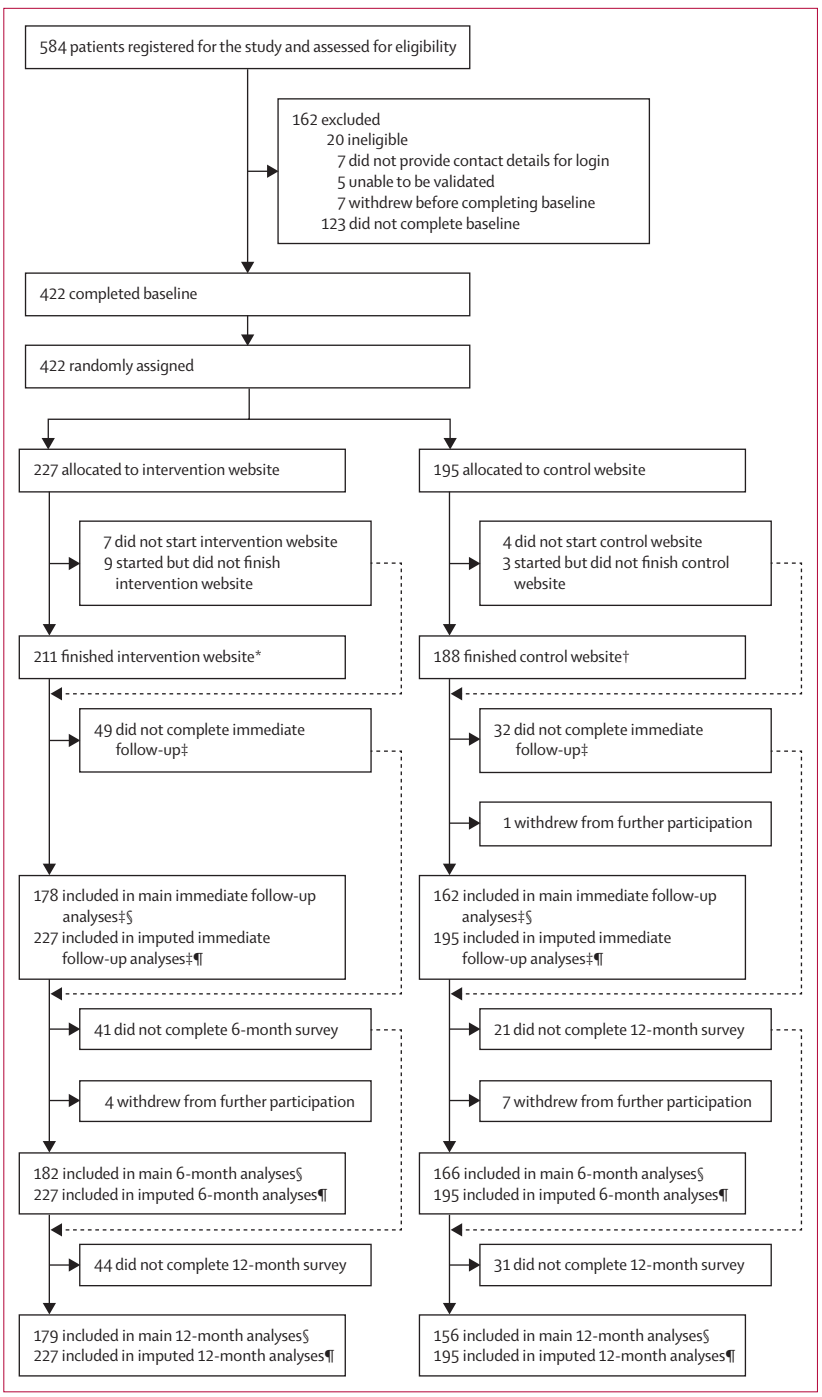

Figure: **Trial profile**
All patients were eligible for inclusion at immediate, 6-month, and 12-month follow-up analyses, regardless of their exclusion from any previous analyses, or their failure to finish the website. Patients who withdrew from further participation were excluded from all following analyses. *Completed I-DECIDE intervention website, up to and including the problem-solving exercise. †Completed the control website, up to and including the emergency safety plan. ‡On the basis of completion of self-efficacy outcome items during the survey presented immediately after website completion. §Intention-to-treat analyses including all available data from all enrolled participants (without imputation of missing data). ¶Intention-to-treat analyses in which missing data for all enrolled participants were imputed using multiple imputation by chained equations.

(195 patients). The final sample of 422 women met our criteria for required sample size. Baseline characteristics of participants were similar between the intervention and control groups (table 1). Follow-up response rates were higher than anticipated, and similar across groups (figure). In the intervention group, 178 (78%) of 227 participants completed immediate follow-up, 182 (80%) completed 6-month follow-up, and 179 (79%) completed 12-month follow-up (figure). In the control group, 162 (83%) of 195 participants completed immediate follow-up, 162 (85%) completed 6-month follow-up, and 156 (80%) completed 12-month follow-up (figure). 6-month data collection occurred between July 17, 2015, and June 26, 2016, and 12-month data collection between Jan 20, and Sept 30, 2016. Process evaluation interviews were done between July 25, 2016, and Nov 20, 2017.

The general healthy relationships page of the control website was accessed by 191 (98%) of 195 control group participants, with 188 (96%) continuing to the static emergency safety plan page (appendix p 2). The I-DECIDE website was accessed by 220 (97%) of 227 intervention group participants, of whom 211 (93%) continued to the final page. Completion rates for each section of the I-DECIDE intervention website were as follows: healthy relationships module completed by 217 (96%) intervention group participants, safety and abuse module completed by 216 (95%) intervention group participants, priorities module completed by 216 (95%) intervention group participants, Contemplation Ladder completed by 200 (88%) intervention group participants, motivational interviewing completed by 47 (21%; all of the women directed to this module) intervention group participants, tailored action plan visited by 214 (94%) intervention group participants, and problem-solving exercise completed by 211 (93%) intervention group participants. 58 (26%) of 227 participants in the intervention group interacted with the I-DECIDE website modules again at 6-month follow-up, and 38 (17%) at 12-month follow-up.

Women in the control group had higher self-efficacy scores at 6 months and 12 months than did women in the intervention group (6 months: 27·5 [SD 5·1] *vs* 28·1 [4·4]; 12 months: 27·8 [SD 5·4] *vs* 29·0 [5·0]; table 2). The point estimates for mean group differences in self-efficacy did not meet the prespecified values of a third of an SD (for full sample: 6 month SD 4·9; 12 month SD 5·2). However, these prespecified values were contained within the associated 95% CIs at both timepoints (imputed mean difference, controlling for baseline at 6 months: 1·3 [95% CI 0·3 to 2·3], at 12 months: 1·6 [0·5 to 2·7]). Additionally, we detected no between-group differences in depression at 6 months or 12 months (6 months: 22·5 [SD 17·1] *vs* 24·2 [17·2], imputed mean difference –0·3 [95% CI –3·5 to 3·0]; 12 months: 21·9 [SD 19·3] *vs* 21·5 [19·3], imputed mean difference –1·9 [95% CI –5·6 to 1·7]; table 2).

We detected no between-group differences for fear of partner or number of helpful actions for safety and wellbeing undertaken at 6 months or 12 months (table 2). Overall, the shorter control website cost less to develop and use than did the intervention website (data not shown; detailed cost-effectiveness data can be obtained on request). We also detected no between-group differences for self-efficacy immediately following completion of the I-DECIDE or control website (table 2). Both groups improved from baseline to 12 months on self-efficacy, depression, and fear of partner (intervention mean change: self-efficacy 1·0 [95% CI 0·3 to 1·7], depression –8·3 [–11·0 to –5·7], fear of partner –2·1 [–2·6 to –1·6]; control mean change: self-efficacy 2·5 [95% CI 1·7 to 3·3], depression –10·5 [–12·9 to –8·2], and fear of partner –1·9 [–2·5 to –1·4]).

Most women in both groups in the trial agreed that they were glad they participated, and around two-thirds agreed that the quality of their life was somewhat better or better (table 3). Immediately after completion of

	Intervention (n=227)	Control (n=195)	Total (n=422)
Age (years)	34·6 (8·1)	32·8 (8·8)	33·7 (8·48)
Level of social support*	13·1 (4·4)	14·1 (4·4)	13·6 (4·5)
Currently in a relationship			
With perpetrator of violence	100 (44%)	93 (48%)	193 (46%)
With different partner	35 (16%)	28 (14%)	63 (15%)
Current marital status with perpetrator of violence			
Marital partner	51 (23%)	37 (19%)	88 (21%)
De facto partner	32 (14%)	30 (16%)	62 (15%)
Ex-marital or ex-de facto partner	86 (38%)	73 (38%)	159 (38%)
Other (not marital or de facto)	57 (25%	54 (28%)	111 (26%)
Perpetrator of violence is female	9 (4%)	7 (4%)	16 (4%)
Children <18 years at home	107 (48%)	80 (42%)	187 (45%)
Unemployed	45 (21%)	37 (21%)	82 (21%)
Received government income support	84 (41%)	75 (44%)	159 (42%)
Aboriginal or Torres Strait Islander	20 (10%)	20 (12%)	40 (11%)
Born outside Australia	36 (18%)	19 (11%)	55 (15%)
Locality†			
Urban	185 (82%)	149 (76%)	334 (79%)
Rural	37 (16%)	37 (19%)	74 (18%)
Remote	4 (2%)	9 (5%)	13 (3%)
Health status (self-rated)			
Excellent	9 (4%)	8 (4%)	17 (4%)
Very good	60 (27%)	42 (22%)	102 (25%)
Good	81 (36%)	80 (42%)	161 (39%)
Fair	52 (23%)	49 (26%)	101 (24%)
Poor	21 (9%)	13 (7%)	34 (8%)
Experienced negative significant life event in the past 6 months	204 (90%)	182 (93%)	386 (92%)
Used smartphone to complete baseline survey (rather than computer or tablet)	35 (15%)	26 (14%)	61 (15%)

Data are mean (SD) or n (%). Some denominators vary because of missing data. *Assessed with the Medical Outcomes Study—social support.[24] †Urban means urban centre with population >10 000, rural means rural area with urban centre with population <10 000, and remote means remote centre or area, as classified by Rural, Remote and Metropolitan Areas classification.[27]

Table 1: **Baseline characteristics**

	Study group*		Main analysis†		Imputed analysis‡	
	Intervention	Control	Coefficient (95% CI)	p value	Coefficient (95% CI)	p value
Primary outcomes						
Self-efficacy						
Baseline	224, 27·0 (5·1)	189, 26·3 (5·9)	..	..	..	..
Immediate§	178, 28·1 (5·4)	162, 26·9 (5·5)	−0·1 (−0·7 to 0·7)	0·895	−0·1 (−0·8 to 0·7)	0·884
6 months	181, 27·5 (5·2)	165, 28·1 (4·4)	1·3 (0·3 to 2·3)	0·0080	1·3 (0·3 to 2·3)	0·012
12 months	176, 27·8 (5·4)	155, 29·0 (5·0)	1·6 (0·6 to 2·7)	0·0023	1·6 (0·5 to 2·7)	0·0038
Depression						
Baseline	222, 30·6 (18·7)	187, 32·5 (18·1)	..	..	..	..
6 months	173, 22·5 (17·1)	158, 24·2 (17·2)	0·4 (−2·7 to 3·6)	0·782	−0·3 (−3·5 to 3·0)	0·866
12 months	177, 21·9 (19·3)	150, 21·5 (19·3)	−2·5 (−6·0 to 1·0)	0·163	−1·9 (−5·6 to 1·7)	0·285
Secondary outcomes						
Fear of partner or ex-partner¶						
Baseline	212, 4·8 (3·0)	180, 4·8 (2·9)	..	..	..	..
6 months	157, 3·0 (2·7)	146, 3·5 (2·5)	0·5 (−0·1 to 1·2)	0·109	0·4 (−0·3 to 1·0)	0·266
12 months	165, 2·7 (2·8)	132, 2·9 (3·0)	0·2 (−0·6 to 0·9)	0·684	0·1 (−0·6 to 0·9)	0·682
Number of helpful actions undertaken‖						
6 months	179, 4·3 (2·6)	158, 4·2 (2·7)	−0·3 (−0·9 to 0·3)	0·347	−0·2 (−0·8 to 0·4)	0·605
12 months	171, 4·2 (2·8)	147, 4·2 (2·6)	−0·1 (−0·8 to 0·6)	0·759	−0·1 (−0·8 to 0·5)	0·711

Results are presented as mean differences with 95% CIs, calculated using mixed effects linear regression with robust SEs, fitted including intercepts at baseline. *n, mean (SD) is shown for all available data from enrolled participants, without imputation of missing data. Denominators vary because of missing data. †Analyses included all available data, from all enrolled participants (without imputation of missing data). ‡Missing data were imputed using multiple imputation by chained equations. §Survey presented immediately after completion of intervention or control website. ¶Level of fear of perpetrator, as rated from 0 (not at all afraid) to 10 (very afraid) on a visual analogue scale. ‖Number of actions undertaken by the participant that they felt were helpful. At baseline the total number of actions undertaken was collected, but the number of actions that were helpful was not collected. Analyses controlled for the total number of actions undertaken at baseline.

Table 2: **Primary and secondary outcomes**

the websites, 301 (89%) of 340 women who responded to this item stated that it was acceptable or very acceptable to be asked about domestic violence in the website. Furthermore, 135 (75%) of 179 women who responded in the intervention group agreed or strongly agreed that participation in the study has increased their awareness of possible issues in their relationship, compared with 91 (57%) of 160 women who responded in the control group (odds ratio 2·3, 95% CI 1·5 to 3·7; p=0·0004). Several women described negative and positive partner behaviours when their partner became aware they were in the trial, but we detected no between-group differences (number of negative partner behaviours at 6 months: mean difference −0·00086 [95% CI −0·1 to 0·1]; p=0·974; at 12 months: mean difference 0·0029 [−0·03 to 0·03]; p=0·845). Intimate partner violence reduced over time for those in the intervention group, as measured by CAS data collected during completion of the intervention website (table 3). CAS scores at 12 months were similar between the intervention and control groups (mean difference −0·1 [95% CI −4·4 to 4·3]; p = 0·981). For the intervention group, the mean change in CAS score from baseline to 12 months was −14·7 (95% CI −18·1 to −11·4). At baseline and 6 months, CAS was not completed by the control group, as it formed part of the intervention website.

32 women agreed to take part in a process evaluation interview (13 [41%] from the intervention group and 19 [59%] from the control group). Women's recollections were hampered by a delay of over 14 months between viewing the original website and being interviewed. This was a particular issue for women in the control group, who had received elements of the intervention (CAS and Danger Assessment) during 12-month follow-up data collection. This affected their memory of what the original comparator website contained, despite receiving reminder screenshots of the content before being interviewed. We recorded key themes with example quotes from participants in the intervention and control arms (appendix pp 7–8). Findings indicated that both websites affected awareness, self-efficacy, getting thoughts straight, pushing for action, having a plan, and perceptions of support. The main differences between the intervention and control groups were around how well the websites linked women with face-to-face support and the amount of tailoring offered to participants. Women in the intervention group also articulated a stronger and more specific sense of the website forcing them to confront the reality of the abuse in their relationship, whereas women in the control group merely talked about becoming more informed about different types of intimate partner violence.

	Intervention			Control		
	Immediate* (n=211)	6 months (n=180)	12 months (n=178)	Immediate* (n=188)	6 months (n=166)	12 months (n=155)
I am glad to be a participant in the I-DECIDE project						
Strongly agree	87 (49%)	103 (62%)	97 (65%)	82 (51%)	80 (57%)	94 (69%)
Agree	82 (46%)	54 (33%)	47 (32%)	66 (41%)	46 (33%)	35 (26%)
Neither agree nor disagree	9 (5%)	7 (4%)	5 (3%)	12 (8%)	10 (7%)	7 (5%)
Disagree	0	1 (1%)	0	0	3 (2%)	0
Strongly disagree	1 (1%)	0	0	0	1 (1%)	0
As a result of questions about domestic violence being asked in this website, I see the quality of my own life as...†‡						
Better	..	58 (35%)	50 (34%)	..	41 (29%)	56 (41%)
Somewhat better	..	48 (29%)	46 (31%)	..	52 (37%)	35 (26%)
About the same as before	..	56 (34%)	52 (35%)	..	45 (32%)	42 (31%)
Somewhat worse	..	4 (2%)	1 (1%)	..	4 (3%)	3 (2%)
Worse	..	0	0	..	0	1 (1%)
For me, being asked questions about domestic violence in this website was...‡						
Very acceptable	92 (51%)	80 (48%)	81 (54%)	87 (54%)	69 (48%)	78 (57%)
Acceptable	73 (41%)	71 (43%)	51 (34%)	49 (30%)	43 (30%)	46 (33%)
Neutral	12 (7%)	15 (9%)	16 (11%)	24 (15%)	29 (20%)	14 (10%)
Unacceptable	2 (1%)	0	1 (1%)	0	2 (1%)	0
Very unacceptable	0	0	0	1 (1%)	0	0
Using this website has increased my own awareness about possible issues in my relationship						
Strongly agree	43 (24%)	44 (27%)	54 (36%)	21 (13%)	37 (26%)	52 (38%)
Agree	92 (51%)	78 (47%)	68 (46%)	70 (44%)	78 (55%)	65 (48%)
Neither agree nor disagree	36 (20%)	33 (20%)	25 (17%)	61 (38%)	24 (17%)	20 (15%)
Disagree	6 (3%)	8 (5%)	1 (1%)	7 (4%)	3 (2%)	0
Strongly disagree	2 (1%)	2 (1%)	1 (1%)	1 (1%)	0	0
Using this website has made me more open to getting support for possible problems in my relationship						
Strongly agree	36 (20%)	38 (23%)	49 (33%)	29 (18%)	35 (25%)	47 (34%)
Agree	96 (54%)	87 (52%)	64 (43%)	72 (45%)	74 (53%)	62 (45%)
Neither agree nor disagree	40 (23%)	34 (21%)	32 (22%)	52 (33%)	27 (19%)	24 (18%)
Disagree	4 (2%)	7 (4%)	4 (3%)	5 (3%)	4 (3%)	4 (3%)
Strongly disagree	2 (1%)	0	0	1 (1%)	1 (1%)	0
Abusive partner's awareness‡						
Aware she was involved in a project about relationship issues	13 (13%)	20 (12%)	14 (9%)	15 (9%)	17 (12%)	14 (10%)
Consequences of abusive partner's awareness‡§						
Number of positive partner behaviours¶ per number of women whose partner was aware	..	0·8/20	0·6/14	..	0·6/17	0·7/14
Number of negative partner behaviours|| per number of women whose partner was aware	..	0·7/20	0·3/14	..	0·6/17	0·3/14
Intimate partner violence level						
CAS score ≥7**	197 (91%)	39 (68%)	118 (67%)	..	..	104 (68%)
Mean CAS score (SD)**	32·1 (23·3)	23·7 (25·9)	17·1 (20·5)	..	..	17·0 (19·5)

Data are n (%) unless otherwise indicated. Some denominators vary because of missing data. CAS=Composite Abuse Score. *Survey was presented immediately following completion of intervention or control website. †Data for this item not collected during immediate follow-up. ‡Items adapted from the consequences of screening tool.[23] §Rate of positive and negative partner behavioural consequences per woman; only women who reported partner awareness of trial involvement were asked to complete this item. Data for this item were not collected during immediate follow-up. ¶For example, improved their behaviour towards her or supported doing something about partner violence. ||For example, got angry, made her more afraid for herself or her children, or restricted her freedom. **Collected at baseline, 6 months, and 12 months for the intervention group, and 12 months for the control group. CAS range can be from 0–150.

Table 3: **Women's quantitative assessment of participation in the trial**

Discussion

We found no differences between groups for depressive symptoms or either of the secondary outcomes (mean amount of fear or number of helpful actions undertaken). However, we observed a small difference in favour of the control group for self-efficacy. Although point estimates of differences in self-efficacy did not meet the prespecified requirement of a third of an SD, associated 95% CIs did not exclude this difference being met. Therefore, our results regarding self-efficacy were inconclusive.

I-DECIDE might have been too complex, requiring too much cognitive processing and options that undermined self-efficacy compared with the simpler control site. Also, the intervention could have created false hope that women might be able to improve their relationship or feel safer, and subsequently at 6 months and 12 months they might have realised they could not. Furthermore, unlike with depression, there is a paucity of literature to guide decisions regarding what represents a clinically meaningful difference in self-efficacy scores.[28] However, it is clear that we did not achieve a difference in depressive symptoms between the study groups, as was found with a previous motivational interviewing face-to-face intervention.[3]

All participants improved their scores for self-efficacy, depression, and fear of partner over time. This improvement could represent a regression to the mean, that both websites assisted women, or that there is a reactivity to the assessments—ie, that the real active component was the measure of assessment, not the intervention website.[29] There might also be an element of naming and validation of participant experience through answering an online advertisement and joining an intimate partner violence trial. Improvement on all outcomes over time, with no clinically meaningful differences between intervention and control, suggests that the intervention website was not harmful compared with a standard website. Additionally, the intervention group experienced reduced initimate partner violence over time, as measured by CAS score, with similar amounts of intimate partner violence in the intervention group and control group at 12 months.

Our process evaluation interviews showed that women appeared to gain awareness, self-efficacy, and the perception of support from both the interactive I-DECIDE website and the static control website. For some women in the control group, simply reading definitions of intimate partner violence was enough to raise their awareness and validate their experiences. Awareness, which is part of the Psychosocial Readiness Model,[12] might be a useful mediator to measure in future intimate partner violence trials; however, there are no existing validated measures of awareness in the available context of intimate partner violence. Our study did appear to show a difference in how many women were aware of a problem in their relationship immediately after use of the intervention website compared with the control website. Both groups indicated that the website helped them to get their thoughts straight without outside interference, and facilitated plans for safety. Women in the intervention group mentioned feeling supported through non-judgemental language and tailored messaging and action plan strategies. By contrast, control group participants criticised the absence of tailoring in their action plan, but nonetheless many felt supported and less isolated just by taking part in the study.

It should be noted that I-DECIDE was not intended to replace face-to-face services, but rather to be a mechanism linking women to services they otherwise would not have accessed through increased self-efficacy and mental health. This benefit of I-DECIDE was supported by the process evaluation interview results, with many women valuing the links and resources provided, particularly in the intervention group. However, qualitative work with women suggests that a preference for face-to-face over online methods of help seeking depends on whether trust or control is valued more highly in a woman's journey to safety.[30] Whether our intervention could have done more to promote this sense of control in women is unclear.[31]

Limitations of this study include the online recruitment, resulting in a need to validate participants as actually being women in Australia, and the unavailablity of the website in languages other than English, which restricted the generalisability of the findings. Our study assessed a self-selected population who engage with social media and had safe access to a computer or smartphone. The use of self-report measures for outcomes might have resulted in some social desirability bias in responses. There might have been a Hawthorne effect (individuals change behaviour as a result of being observed) from the baseline surveys, with participants responding to the survey measures, which could have attentuated any intervention effect.[29] The ethical challenge is that we need to provide safety strategies for control participants, which might result in an effect on participants. Strengths of our study include the masking of participants and the research team and the high participant retention rate.

The implications of this trial are that our hypotheses were not confirmed and we cannot recommend our complex web intervention[4,31] that aimed to be both a safety decision aid and healthy relationship tool. However, we do know that continuing to provide abuse, risk, and safety information online is useful to many women, with a static website currently being a cheaper, shorter option compared with an interactive website. Both quantitatively and qualitatively, women reported no harm and some benefits from accessing the I-DECIDE and control websites. However, overall the interactive online tools[4,8,9] did not show improved outcomes for participants compared with static websites. More research is needed into what works, why, and for whom, as both the US and New Zealand safety decision aids worked for subpopulations of women.[8,9] Tailoring and piloting any website intervention to different populations of women (eg, those who are leaving or staying in their relationship, and different cultural groups) is required before further investigation at a randomised controlled trial level.

Contributors

KH, NG, EM, LT, JV, CH, AT, and LG contributed to study design. LT, JV, and KN contributed to participant recruitment, follow-up, and data collection. LT and KN also contributed to qualitative interviews. LT did

qualitative data analyses and JV did quantitative data analyses. KH, LT, CH, AT, LG, NG, JV, and EM contributed to data interpretation. KH, LT, and JV wrote the manuscript, and EM, CH, AT, LG, and NG provided critical revision of the manuscript. All authors approved the manuscript before submission.

Declaration of interests

We declare no competing interests.

Data sharing

Deidentified individual participant data underlying the results reported in this Article (text, tables, figures, and appendices) can be available to investigators whose proposed use of the data has been approved by the chief investigators of this study, in accordance with The University of Melbourne data policies.

Acknowledgments

The I-DECIDE project was funded by a Discovery Project grant from the Australian Research Council (grant no DP130102799). We thank our trial participants and acknowledge the work of James Case (website developer), David Ormiston-Smith (database manager), and Tigerspike (website design concept).

References

1 WHO. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. Geneva: World Health Organization, 2013.

2 Garcia-Moreno C, Hegarty K, d'Oliveira AF, Koziol-McLain J, Colombini M, Feder G. The health-systems response to violence against women. *Lancet* 2015; **385:** 1567–79.

3 Hegarty K, O'Doherty L, Taft A, et al. Screening and counselling in the primary care setting for women who have experienced intimate partner violence (WEAVE): a cluster randomised controlled trial. *Lancet* 2013; **382:** 249–58.

4 Tarzia L, Murray E, Humphreys C, et al. I-DECIDE: an online intervention drawing on the psychosocial readiness model for women experiencing domestic violence. *Womens Health Issues* 2015; **26:** 206–18.

5 Tarzia L, Iyer D, Thrower E, Hegarty K. "Technology doesn't judge you": young Australian women's views on using the internet and smartphones to address intimate partner violence. *J Technol Hum Serv* 2017; **35:** 199–218.

6 Berger M, Wagner T, Baker L. Internet use and stigmatized illness. *Soc Sci Med* 2005; **61:** 1821–27.

7 Eden KB, Perrin NA, Hanson GC, et al. Use of online safety decision aid by abused women. *Am J Prev Med* 2015; **48:** 372–83.

8 Glass N, Perrin N, Hanson GC, et al. The longitudinal impact of an internet safety decision aid for abused women. *Am J Prev Med* 2017; **52:** 606–15.

9 Koziol-McLain J, Vandal A, Wilson D, et al. Efficacy of a web-based safety decision aid for women experiencing intimate partner violence: randomized controlled trial. *J Med Internet Res* 2018; **19**: e426.

10 Dutton M. Empowering and healing the battered woman. New York: Springer, 1992.

11 Ford-Gilboe M, Varcoe C, Scott-Storey K, et al. A tailored online safety and health intervention for women experiencing intimate partner violence: the iCAN Plan 4 Safety randomized controlled trial protocol. *BMC Public Health* 2017; **17:** 273.

12 Cluss PA, Chang JC, Hawker L, et al. The process of change for victims of intimate partner violence: support for a psychosocial readiness model. *Womens Health Issues* 2006; **16:** 262–74.

13 Hegarty K, Tarzia L, Murray E, et al. Protocol for a randomised controlled trial of a web-based healthy relationship tool and safety decision aid for women experiencing domestic violence (I-DECIDE). *BMC Public Health* 2015; **15:** 736.

14 Tarzia L, Valpied J, Koziol-McLain J, Glass N, Hegarty K. Methodological and ethical challenges in a web-based randomized controlled trial of a domestic violence intervention. *J Med Internet Res* 2017; **19:** e94.

15 Eysenbach G. CONSORT-EHEALTH: Improving and standardizing evaluation reports of web-based and mobile health interventions. *J Med Internet Res* 2011; **13:** e126.

16 Hegarty K, Bush R, Sheehan M. The composite abuse scale: further development and assessment of reliability and validity of a multidimensional partner abuse measure in clinical settings. *Violence Vict* 2005; **20:** 529–47.

17 Campbell JC, Webster DW, Glass N. The danger assessment: validation of a lethality risk assessment instrument for intimate partner femicide. *J Interpers Violence* 2009; **24:** 653–74.

18 Biener L, Abrams DB. The contemplation ladder: validation of a measure of readiness to consider smoking cessation. *Health Psychology* 1991; **10:** 360–65.

19 Miller WR, Rose GS. Toward a theory of motivational interviewing. *Am Psychol* 2009; **64:** 527–37.

20 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006; **3:** 77–101.

21 Schwarzer R, Jerusalem M. Generalized Self-Efficacy Scale. In: Weinman J, Wright S, Johnson M, eds. Measures in health psychology: a user's portfolio. Causal and control beliefs. Windsor: Nfer-Nelson, 1995: 35–37.

22 Eaton W, Muntaner C, Smith C, Tien A, Ybarra M. Center for Epidemiologic Studies Depression Scale: review and revision (CESD and CESD-R). In: Maruish M, ed. The use of psychological testing for treatment planning and outcomes assessment, 3rd edn). Mahwah: Lawrence Erlbaum Associates, 2004: 363–77.

23 Lock J. The development of the Consequences of Screening Tool and the psychometric assessment of three woman abuse measures [thesis]. Hamilton, ON: McMaster University; 2008.

24 Sherbourne CD, Stewart AL. The MOS social support survey. *Soc Sci Med* 1991; **32:** 705–14.

25 Gunn J, Gilchrist GP, Chondros P, et al. Who is identified when screening for depression is undertaken in general practice? Baseline findings from the diagnosis, management and outcomes of depression in primary care (Diamond) longitudinal study. *Medical J Aust* 2008; **188** (12 Suppl): S119–25.

26 Furukawa T, Leucht S. How to obtain NNT from Cohen's d: comparison of two methods. *PLoS One* 2011; **6:** e19070.

27 Department of Primary Industries and Energy, Department of Human Services and Health. Rural, remote and metropolitan areas classification. 1991 census edition. November 1991. Canberra: Australian Government Publishing Service, 1994.

28 McPeake J, Shaw M, Iwashyna TJ, et al. Intensive care syndrome: promoting independence and return to employment (InS:PIRE). Early evaluation of a complex intervention. *PLoS One* 2017; **12:** e0188028.

29 McCambridge J, Witton J, Elbourne D. Systematic review of the Hawthorne effect: new concepts are needed to study research participation effects. *J Clin Epidemiol* 2014; **67:** 267–77.

30 Tarzia L, Cornelio R, Forsdike K, Hegarty K. Women's experiences receiving support online for intimate partner violence: how does it compare to face-to-face support from a health professional? *Interact Comput* 2018; **30:** 433–43.

31 Tarzia L, May C, Hegarty K. Assessing the feasibility of a web-based domestic violence intervention using chronic disease frameworks: reducing the burden of 'treatment' and promoting capacity for action in women abused by a partner. *BMC Womens Health* 2016; **16:** 73.