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Computer and website-based interventions to improve common mental health problems in university students: a meta-analysis

E Bethan Davies*, Richard Morriss & Cris Glazebrook
[1]Division of Psychiatry & Applied Psychology, The University of Nottingham
*mcxebd@nottingham.ac.uk

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

MentalHealth ResearchUK

Background

- Anxiety and depression are common mental health problems experienced by university students, and can impair their academic and social functioning[1].
- Young people's professional help-seeking for mental health problems is limited; they tend to prefer informal help (e.g. friends) rather than professional help[2].
- Students cite various barriers and hurdles to seeking help, e.g. perceived stigma, impact of disclosure and lack of perceived need for help[3].
- Universities and students are well connected to computerised and internet-enabled technologies - online interventions could be useful health promotion strategies to improve students' mental health[4].
- These interventions hold advantages that may be favourable to students, e.g. anonymity and privacy of access[4].

Aim: to review the effectiveness of computer and website-based interventions to improve mental health and well-being outcomes in university students. This expands upon a review of technology-based interventions for mental health in tertiary students[5].

Methodology

- **Inclusion criteria:** was randomised controlled trial (RCT); intervention was self-guided (no contact with health professionals) and designed to change psychological well-being or mental health symptomology with relevant outcome measures; intervention was delivered and accessed via internet or computer; interventions had minimal human contact; trialled on higher education students only.
- **Exclusion criteria:** did not measure targeted mental health symptomology; not trialled on higher education students; not RCT; used historical controls; both experimental and comparison groups received same intervention with no controls.
- Search of several databases and hand-searches conducted March-April 2012 and repeated June 2013.
- Data extracted using template based on Cochrane Review guidelines[6] and CONSORT eHEALTH checklist[7]. Trial quality assessed using Cochrane Collaboration's risk of bias tool[6].
- *RevMan* software used to extract and analyse outcome data where possible for meta-analysis.

Findings

17 studies (N=1795 participants) identified through the search (see Figure 1):
- Seven studies involved same three interventions on different samples; therefore 14 unique interventions.
- Sample size ranged from 28 to 240; mean age of participants was 22.6 yrs.
- Majority of studies (N=7) in USA; gender balance ranged from 50% to 88.46% of sample being female.
- Ten studies had undergraduate samples; seven studies recruited psychology students only.

Majority of studies focused on improving depression and/or anxiety (N=11), but also to improve psychological distress (N=3), stress (N=4), social anxiety (N=1) and examination anxiety (N=1):
- Seven studies applied interventions which aimed to improve students' relationship functioning, decrease perfectionism, increase use of mindfulness, increase use of lucid dreaming to mediate depression, and increase social support, hardiness and acculturation among international students.
- 11 studies were 'selective'/'indicative' - participants screened for specific symptomology related to depression, anxiety or other risk factors.

Types of intervention:
- 13 studies delivered intervention via a website or university intranet; other four were offline computer programs delivered in research setting (e.g. computer lab).
- 12 interventions were in a modular/sectional format.
- Nine were based on CBT; one intervention based on mindfulness; another on stress management theory.
- Delivery period of intervention ranged from 2 to 12 weeks; median length 6 weeks.
- Nine studies involved minimal guidance through human support, e.g. reminder emails, support for completing the intervention, or completed in researcher-monitored setting.

Risk of bias judged as **moderate**: e.g. randomisation not described, 7 studies did completers' analyses (see Figure 2).

Figure 1: Flowchart of search process

Titles and abstracts retrieved from search: N=6494

Duplicates: N=1332
Other excluded citations: N=5059

Full text articles obtained: N=103

No mental health outcomes: N=65

Papers retained for coding: N=38

Studies excluded upon further analysis: N=19

Follow-up study or repeated publication; data extracted and incorporated into original study: N=2

Studies included in the review: N=17

Meta-analysis

- **Compared to inactive controls**: analyses favoured intervention for anxiety (n=374, 7 RCTs, *SMD* -0.56, CI -0.77 to -0.35, Z=5.19, P=<.001: I^2=0%, P=.63), depression (n=712, 9 RCTs, *SMD* -0.43, CI -0.63 to -0.22, Z=4.06, P=<.001: I^2=39%, P=.11), and stress (n=217, 3 RCTs, *SMD* -0.73, CI -1.27 to -0.19, Z=2.64, P=.008: I^2=72%, P=.03) outcomes. Neither condition was favoured for psychological distress.
- Participants were more likely to leave study early if they were in intervention condition than inactive control (N=999, 11 RCTs, *OR* 2.73, CI 1.56 to 4.76, Z=3.54, P=<.001: I^2=30%, P=.20)

- **Compared to active controls**: analyses did not support either condition for anxiety (n=229, 2 RCTs, *SMD* -0.18, CI -0.98 to 0.62, Z=0.45, P=.66: I^2=88%, P=<.001) or depression (n=229, 2 RCTs, *SMD* -0.28, CI -0.75 to 0.20, Z=1.14, P=.25: I^2=67%, P=.08).
- **Compared to comparison interventions** (e.g. face-to-face CBT): analyses did not support either condition for anxiety (n=198, 4 RCTs, *SMD* -0.10, CI -0.39 to 0.18, Z=0.71, P=.48: I^2=0%, P=.90), or depression (N=198, 4 RCTs, *SMD* 0.33, CI -0.43 to 1.09, Z=0.85, P=.40: I^2=82%, P=<.001).

Figure 2: Judged risk of bias of included studies

Random sequence generation (selection bias)
Allocation concealment (selection bias)
Blinding of participants and personnel (performance bias)
Blinding of outcome assessment (detection bias)
Incomplete outcome data (attrition bias)
Selective reporting (reporting bias)
Other bias

0% 25% 50% 75% 100%

Low risk of bias   Unclear risk of bias   High risk of bias
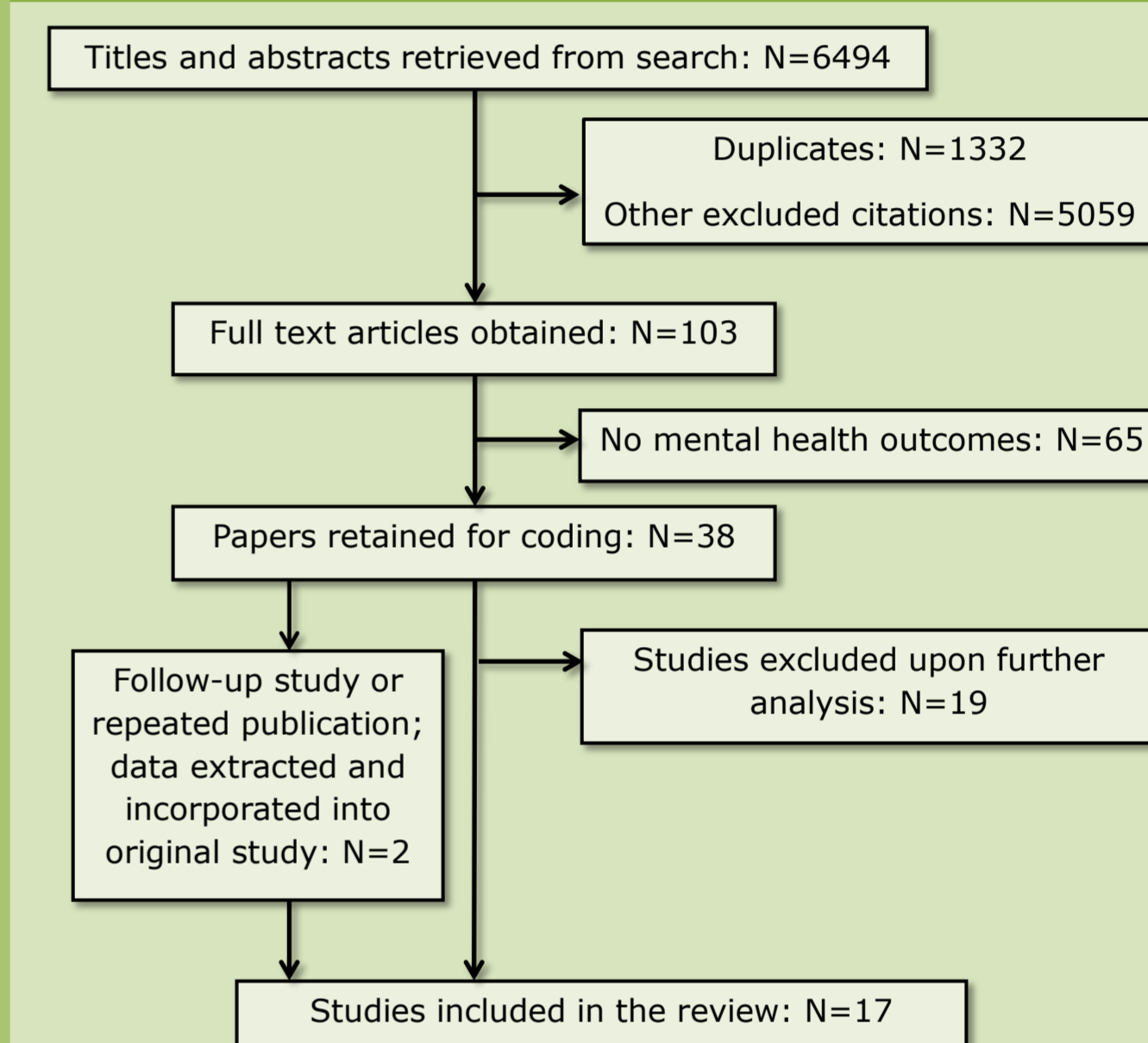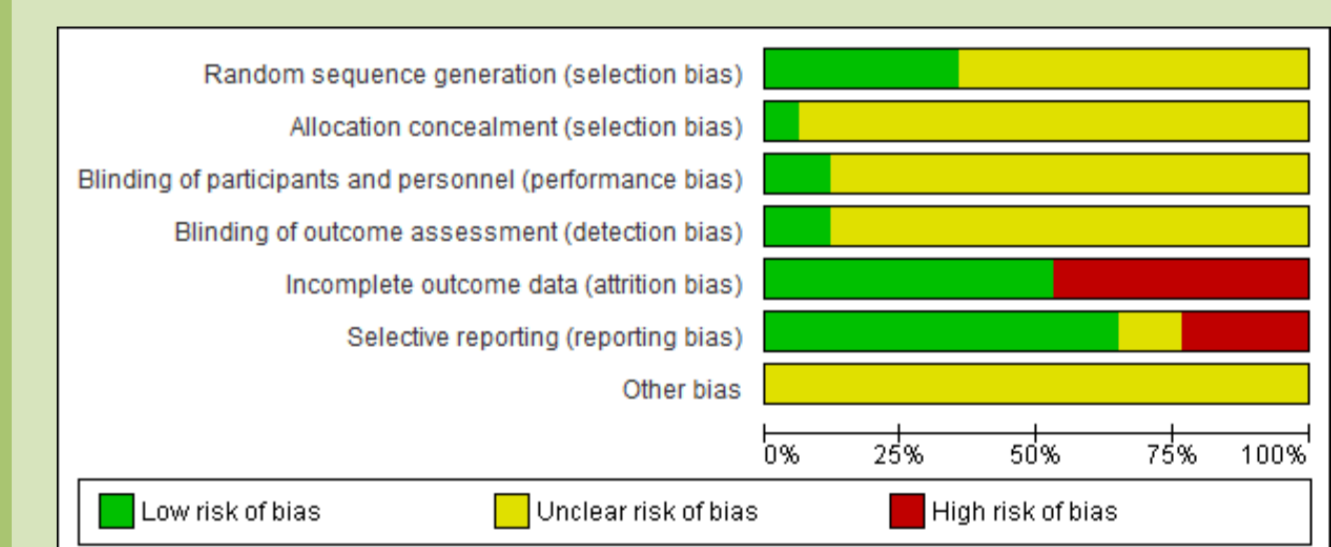
Discussion and Implications

- Website-based and computer-delivered interventions were found to help improve depression, anxiety and stress outcomes in university students when compared to no intervention.
  - Neither intervention or comparison intervention or active control were significantly favoured in meta-analysis, which may suggest some equivalence in their effect upon improving outcomes.
- Ten studies reported skewed post-intervention data on one outcome and not all data could be extracted for analysis; this may affect the calculated effect sizes.
- Small samples were common, and several used psychology or health sciences students and oversampled females.
  - Future research needs to explore whether interventions are effective for students in other disciplines, and need to sample more males: young male adults are frequently cited as being less likely to seek out help for their mental health[8].
  - Mean age of overall sample in review deviates slightly from traditional age range of university students.
- Limited follow-up conducted – only five studies conducted follow up.
  - No studies looked at whether participants' help-seeking intentions or behaviours improved as result of intervention.
  - These kinds of interventions are a form of mental health prevention – therefore these outcomes are important.
- Difficult to decipher the intervention 'ingredients' which aided or hindered their effectiveness – authors could use CONSORT eHEALTH checklist[7] to aid clarity of intervention content.

- Small number of outcome measures made comparisons less complicated - but combined with skewed data and differences in baseline symptomology, it may have resulted in heterogeneity in analyses.
- Provision of human support (e.g. giving reminders) is important – may give participants motivation to complete intervention.
  - Students may be less inclined to engage with intervention if they do not have any support to complete it.
- Some interventions trialled in this review may not be designed specifically for university students[5].
- Overall we judged a 'moderate' risk of bias - mostly due to insufficient reporting of trial methodology and how outcome data were analysed.
- Several British HEIs have incorporated website-based interventions into their welfare services[9] - best improvements in mental health outcomes may be achieved through combining self-help with face-to-face support[10].
  - Online interventions could be used as a support tool by students whilst waiting to see a relevant professional.
- Student evaluation beneficial to exploring their perceptions of interventions:
  - Usability testing and evaluation of interventions could explore whether they are appropriate for students, the relevancy of their content etc.
  - Changes could be made to help improve effectiveness of interventions, or to target specific student sub-groups (e.g. international students, students in different disciplines of study).
- Mobile/tablet apps are also another intervention strategy potentially preferable for this population – further research in this area is encouraged.

References: [1] Zivin K, Eisenberg D, Gollust SE, Golberstein E: Persistence of mental health problems and needs in a college student population. Journal of Affective Disorders 2009, 117(3):180-185. **[2]** Gulliver A, Griffiths KM, Christensen H: Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. BMC Psychiatry 2010, 10(1):1-9. **[3]** Chew-Graham CA, Rogers A, Yassin N: 'I wouldn't want it on my CV or their records': medical students' experiences of help-seeking for mental health problems. Medical Education 2003, 37(10):873-880. **[4]** Ryan ML, Shochet IM, Stallman HM: Universal online interventions might engage psychologically distressed university students who are unlikely to seek formal help. Advances in Mental Health 2010, 9(1):73-83. **[5]** Farrer, L., Gulliver, A., Chan, J. K., Batterham, P. J., Reynolds, J., Calear, A., Griffiths, K. M. (2013). Technology-based interventions for mental health in tertiary students: Systematic review. J Med Internet Res, 15(5) **[6]** Higgins JPT, Green S. Cochrane Handbook for Systematic Reviews of Interventions. Chichester, United Kingdom: John Wiley & Sons Ltd; 2008. **[7]** Eysenbach G, CONSORT-EHEALTH Group: CONSORT-EHEALTH: improving and standardizing evaluation reports of Web-based and mobile health interventions. Journal of Medical Internet Research 2011, 13(4). **[8]** Ellis L, Collin P, Hurley P, Davenport T, Burns J, Hickie I. Young men's attitudes and behaviour in relation to mental health and technology: Implications for the development of online mental health services. BMC Psychiatry 2013; 13(1). **[9]** Ultrasis. 2008. Leading universities purchase Relief series and Beating the Blues programmes. http://ultrasisplc.com/news/article/170.html. **[10]** Rickwood D, Bradford S. The role of self-help in the treatment of mild anxiety disorders in young people: An evidence-based review. Psychol Res Behav Manag 2012; 5: 25-36.