Literature Review and Critical Appraisal

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Background

The hallmark of generalised anxiety disorder (GAD) is excessive worry that no longer serves as a driving factor and instead becomes crippling and unhelpful (Slee et al., 2021). Physical, emotional and social impairments are daily struggles for those living with GAD (Archer et al., 2022). Worse yet, the healthcare system bears the brunt of GAD due to lack of motivation to go to work, frequent hospital visits (Konnopka and Konig, 2020) and the potential comorbidity for other mental health problems (Saha et al., 2021). Archer et al. (2022) recognise that the incidence of anxiety symptoms increased from 6.2/1,000 person-years at risk (PYAR) in 2003 to 14.7/1,000 PYAR indicating an epidemiological rise in its prevalence. Unfortunately, few people who suffer from anxiety and its associated mental health symptoms ever seek therapy, despite the fact that doing so could lessen the severity and likelihood of the severity of mental health disorders (Wakefield et al., 2021). In addition to demonstrating benefits such as easy access, flexible use, and freedom of location and time, online therapies often report efficacy that rivals that of the original treatments (Feijt et al., 2020). They are less expensive than in-person therapy and they provide a great deal of confidentiality and independence (Taylor et al., 2020). This research intends to evaluate the relevance of online therapy as an ideal alternative to other nonpharmacological interventions for GAD.

The research question of this review is:

"Among adults with anxiety, how effective is online/digital platform-based therapy compared to standard care in reducing symptoms of anxiety?

Literature Search Strategy

Use of the PICO framework (Ericksen and Frandsen, 2018) was essential to structuring the research question. Table 1 presents the core elements of the PICO framework.

Table 1: PICO elements

- Population Adults with anxiety (age 18 and above)
- Intervention Online/digital platform-based therapy
- Comparator Standard care or control
- Outcome Reducing symptoms of anxiety

The core inclusion/exclusion criteria used in the study are highlighted in Appendix I. The search terminology used in the study was based on the PICO elements, which were connected by Boolean operators to form search strings. Appendix I presents the search terminology. The databases used for the search were PubMed and CINAHL. Citations generated from the search were exported to EndNote for further processing. The inclusion and exclusion criteria were applied to identify articles that were most relevant to the study. Overall, 52 articles were identified from the three databases. After removing duplicates, 24 articles were identified. The application of inclusion/exclusion criteria and selecting randomised controlled trials (RCTs) as the chosen research design led to the selection of three articles (Finnerty et al., 2023; Wang et al., 2023; Rubel et al., 2024). Appendix II presents the summary of the chosen articles.

Critical Appraisal of the Evidence

The three selected studies (Wang et al., 2023; Finnerty et al., 2023; Rubel et al., 2024) adopt a parallel design. Parallel design in an RCT involves exposing a specific sub-group of participants to a single study intervention (Machin et al., 2021). Wang et al. (2023) present a three-arm RCT comparing the intervention (online brief modified mindfulness-based stress reduction) against a comparator (cognitive behavioural therapy) and a control (waitlist group). Finnerty et al. (2023) conducted a four-arm comparative study that compared online active group music group therapy and online receptive group music therapy (both interventions) with ongoing verbal group therapy (comparator and standard care) and no intervention (control group) to evaluate their impact on stress. On the other hand, Rubel et al. (2024) had a two-arm RCT where an intervention group (online self-help programme based on evidence-based practice) was compared against a control group (waitlist group).

Several strengths are evident across all three studies (Finnerty et al., 2023; Wang et al., 2023; Rubel et al., 2024). These include ensuring that there is a clear research question that can be answered using the PICO approach, detailing the study protocol and interventions, and relating the study findings to the broader evidence base. This essay focuses on three parameters within the CASP checklist (CASP, 2018): randomisation and blinding, group selection and similarity, and reporting of the results.

As part of critical assessment, the nature of randomisation and participant monitoring is compared across the studies. In the study by Finnerty et al. (2023), a block randomisation approach was adopted. Through a power analysis, it was observed that a sample size of 159 was required as a minimal sample size for detecting a medium effect. To reach this sample size, a block randomisation approach was preferred. According to Cook (2023), block randomisation is a good strategy for ensuring balance in sample size across groups. Rubel et al. (2024), on the other hand, used non-stratified 1:1 randomisation. This approach is a simple randomisation process where participants are alternatively allocated to the intervention or the test group. Wang et al. (2023) do not define the nature of randomisation. However, participants in their research were assigned to one of the three treatment groups through computer-generated random numbers following a simple randomisation method. According to Lim and In (2019), a good randomisation strategy should ensure that there is true randomness in the selection of participants. The use of a computer-generated randomisation process in the studies by Wang et al. (2023) and Rubel et al. (2024) supports such selection. In contrast, in Finnerty et al. (2023), randomisation was carried out by the researchers, which could be open to potential bias (Suresh, 2011).

A single blind RCT approach at the researcher level was evident in two of the studies. According to Zabor et al. (2020), the nature of an intervention makes it challenging to blind the participants. In Wang et al. (2023), while participants were aware of the treatment allocation process, the data set was blinded to make sure that the research term was blinded to the outcomes of the trial. Similarly, Rubel et al. (2024) blinded the researchers from the study intervention. The initial clinical interview was carried out by a non-project member. After data collection, statistical analysis occurred blindly to ensure that the researchers were not aware of treatment

allocation. In contrast, Finnerty et al. (2023) did not take steps to blind the researchers, which is a weakness. In order to guarantee the objective determination of outcomes, it is essential to blind data collectors and result adjudicators (Renjith, 2017). Statistical evaluation of the experiment is a potential source of bias due to the possibility of biased reporting and the application of statistical tests that may support one group (Karanicolas et al., 2010). Wang et al. (2023) and Rubel et al. (2024) are able to avoid this type of researcher bias through blinding of the researchers. As part of participant selection and monitoring, RCTs are required to account for losses to follow-up until the completion of the study. Wang et al. (2023) and Rubel et al. (2024) present a clear flowchart of participant engagement, participant loss, and reasons for loss of participants across each arm.

As part of randomisation, understanding the relevance of a negative control group is important. The strength of the three chosen studies is that they all have a negative control group. Wang et al. (2023) and Rubel et al. (2024) have a negative control as part of the research intended in the form of a waitlist, while Finnerty et al. (2023) have a no intervention group as a negative control. Research has shown that a negative control group provides a better baseline comparison for experimental outcomes and can control for confounding variables (Piantadosi and Meinert, 2022). Additionally, Piantadosi and Meinert (2022) contend that having a negative control group is effective in detecting other impacts like placebo effects and to enhance overall internal validity.

According to Spieth et al. (2016), a good RCT ensures that the participants chosen for the research are similar at the start of the RCT to avoid the impact of covariates and confounding variables. In two studies, steps were taken to create clear inclusion and exclusion criteria to select both the intervention and control groups. In Wang et al.'s (2023) study, participants were included if they had a high GAD score, access to a smartphone or computer, and could give informed consent. Participants were excluded on the basis of severe physical or other mental health issues, including cognitive impairment and substance or alcohol abuse. Rubel et al. (2024) included participants who met criteria for GAD, were adults, had access to the internet, and were able to provide informed consent. Subjects were excluded if they had a past diagnosis of severe mental health illness, substance dependence or suicidality. In contrast, in Finnerty et al. (2023), while adult students were chosen, no clear

inclusion or exclusion criteria were identified. When there are no inclusion and exclusion criteria, sample selection becomes challenging as there is high diversity (Cook, 2023). Similarly, the lack of such criteria could mean that there is a reduction in internal validity, making it challenging for future study replication and generalisability (Zabor et al., 2020).

Wang et al. (2023) and Rubel et al. (2024) present a comparison of baseline data on demographics and healthcare use. They found no differences across the arms of the RCT. No baseline evaluation is evident in Finnerty et al. (2023). The lack of clear inclusion and exclusion criteria and baseline assessment in Finnerty et al. (2023) can be attributed to its pre-test-post-test comparison across each group. However, the limitation in baseline assessment is a definite weakness. According to Holmes (2024), when there are no baseline data, it could lead to difficulties conducting baseline measurements for changes over time between and within groups. Relatedly, Burgess et al. (2003) conclude that the purpose of baseline data is to ensure the identification and analysis of effects within subgroups: without such data it becomes challenging to determine how diverse subgroups may have reacted to the proposed intervention.

The importance of power in calculating sample size is present in all three studies. Wang et al. (2023) used α = 0.05, 90% power and an effect size of 0.35 to calculate participant size. They accounted for early attrition of 30% when estimating their sample size. Finnerty et al. (2023) used α = 0.05 and 80% power to detect sample size. However, they did not consider the initial attrition rate while calculating the sample size. Rubel et al. (2024) used α = 0.25, and 80% power to calculate sample size. Power calculation in essential to RCTs as it can determine the true effect size and can reduce the chance of Type II errors (Wittes, 2002). Zabor et al. (2020) contend that lower alpha levels and higher power are essential for robust results. Since all three studies have high power (80–90% chance of detecting a true effect), the sample size calculation is optimal and a key strength.

Wang et al. (2023) used analysis of co-variance (ANCOVA) to compare outcomes across groups. In their study, the participants' results were assessed six months after the study using an intent-to-treat approach. Rubel et al. (2024) used a similar intent-to-treat approach and a linear mixed model to assess the impact of the intervention

on the intervention and control groups. Use of an intent-to-treat approach in data analysis is evident in both studies. However, a challenge with this methodology is that it does not handle missing data, especially participants who exit the study (Kim et al., 2021). This approach also includes participants regardless of their adherence to treatment protocols, which could indicate dilution of treatment effects (Shrier et al., 2014). Finnerty et al. (2023) used a one-tailed pair t-test for each of the therapy groups for pre- and post-test differences. Additionally, a Bayesian ANOVA is used to test differences between groups (independent variable) across a single factor (i.e. GAD). The study also provided long-term outcomes at six months across all groups. It is important to note that none of the studies reported relative effects like risk ratio and odds ratios and only one study (Rubel et al., 2024) reported confidence intervals (CI). According to Hazra (2017), Cis are important as they can predict the range within which the true effect size is present. For example, if the above studies had a CI, it could assess the range with which there is a true effect of online counselling on anxiety. If the CI is narrow, it can provide a more precise estimate of the effectiveness of the chosen intervention.

Overall, this research concludes that there is moderate to high methodological rigour across the three studies. Across all three studies, there is clarity in research question development, intervention description and implementation, presentation of findings and discussion in relation to the broader context. Two studies (Wang et al., 2023; Rubel et al., 2024) present a comprehensive assessment of blinding and randomisation, participant selection and baseline data comparison. There remain questions across the three studies on the presentation of results, as odds ratios and effect size are not reported for all studies.

Synthesis of Evidence

It is important to recognise some key contributions to research from the three studies. This section presents a comprehensive synthesis of this evidence base.

The three studies adopted diverse interventions as online therapy for anxiety. For example, Wang et al. (2023) evaluated the relevance of a mindfulness-based stress reduction (MBSR) intervention provided through a digital medium. The intervention was a condensed and refined version consisting of education regarding mindfulness

principles, mindfulness exercises, compassion practice and meditation. Finnerty et al. (2023), on the other hand, evaluated the relevance of an online music therapy. They tested two different forms of music therapy, receptive and active. The active music therapy included song writing, singing and lyrical analysis, while the receptive music therapy was participant-directed music listening. Rubel et al. (2024) developed Selfapy, an online self-help programme for the treatment of GAD. The programme, developed according to evidence-based practice, including cognitive behavioural therapy exercises and elements of mindfulness therapy. Across all three studies, the online therapy was provided by experts and patients were monitored by a psychologist.

The effect of online therapy in creating the same degree of results as traditional therapy is evident across all studies. Wang et al. (2023) showed that the MBSR programme was effective in addressing primary outcomes of anxiety, somatisation, depression, stress and insomnia when compared to the control group. Furthermore, the results showed that there can be rapid alleviation of psychological problems, including self-reported anxiety, showing similar outcomes to the comparator—i.e. conventional cognitive behavioural therapy. Rubel et al. (2024) concluded that the use of online self-help interventions brought about a statistically significant reduction in GAD symptoms when compared to the control group. Finnerty et al. (2023) recognised that all three types of treatment—verbal therapy, active music therapy, and receptive music therapy—saw a substantial drop in self-reported ratings between baseline and follow up. Also, a Bayesian ANOVA analysis revealed that there was no difference between the groups. This evidence shows that compared to the control group, there was a significant improvement in patients' anxiety symptoms. Additionally, when compared to an alternative intervention (standard care), the online therapy for anxiety had comparable effects.

Implications for Practice

NICE (2020) guidelines on GAD acknowledge the importance of psychological therapies as essential to the treatment process. The current essay presents a strong rationale for the use of online therapy options. Online therapies can be considered an ideal alternative to provide sustained long-term care. As Wang et al. (2023) conclude, online therapy can be an ideal low-cost alternative to in-person therapy. As

all three studies show, the use of online therapy options provides an opportunity to look for alternative ways to provide care. NICE (2023) recognises the importance of digital technology as key to providing care to patients with mental health needs and as a primary tool to reduce inequity in care. A potential challenge can be the choice of therapy, as the three studies described in this research acknowledge diverse interventions. At the same time, as Williams et al. (2020) recognise, it can be challenging to implement widespread digital solutions given the complexities of care provision within the NHS. As Williams et al. (2020) conclude, if digital solutions are implemented, it is essential to address broader clinician and individual concerns linked to data privacy, equality of access, clinical efficacy and safety. Therefore, before online therapy options are discussed, it is important to evaluate the digital infrastructure and environment that can provide access to treatment.

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Appendix I

Inclusion and Exclusion Criteria

| | Inclusion Criteria | Exclusion Criteria |
|-------------------------|--|--|
| Population | Adults (18 and above) | Children and adolescents |
| Type of intervention | Online therapy interventions targeting anxiety | Online therapies which are generic and do not address depression |
| Location | Any geographic location | NA |
| Language of publication | English | Non-English studies or studies translated to English |
| Publication type | Peer-reviewed journals focusing RCT | Non-peer reviewed studies. |
| Year of Publication | 2014-2024 | Prior to 2014 |

Search Terminology

| PICO Element | Search Terms | |
|--------------|--|--|
| Population | "adults with anxiety", "generalized | |
| | anxiety disorder", "GAD" | |
| Intervention | "online therapy", "digital platform-based | |
| | therapy", "internet-based therapy", | |
| | "online counselling" | |
| Comparison | "standard care", "usual care", "traditiona | |
| | therapy", "in-person therapy" | |
| Outcome | "reducing symptoms of anxiety", "anxiety | |
| | reduction", "improving anxiety | |
| | symptoms", "anxiety management" | |

Appendix II

| Author | Study Aim and Design | Methods of Data collection and | Key Findings | Comments |
|---------------------|---|---|---|---|
| Wang et al., (2023) | The purpose of this study is to assess the viability and efficacy of a six-session web-based mindfulness treatment (mMBSR) to decrease symptoms of anxiety and associated mental health complaints in people who were chosen at random from the general community. This study design is a parallel randomised controlled trial (RCT). | analysis The research is single blinded. An impartial researcher with unfettered access to all data ran the statistical analysis. There was a total of six sessions that made up the intervention, and each session lasted three weeks and included homework every day. Each intervention lasted about 60 minutes and took place in a group setting via live video conference with a trainer who had a degree in clinical psychology and psychotherapist certification. Everybody in the group could view everyone else's screens and ask each other questions via their phones or computers. By choosing to remain anonymous and refraining from disclosing too many personal details, they were able to keep their privacy intact. Meditation, compassion practice, mindfulness training, and an overview of mindfulness principles made up the streamlined mMBSR. Depression and anxiety education, the CBT cycle, and basic CBT skills were all included of the online CBT intervention. The supplemental materials provide more information. While the intervention was | At baseline, after therapy, and again six months later, participants filled out diverse tools to assess overall health, generalised anxiety, stress, insomnia. The study randomly assigned 150 people suffering from anxiety symptoms to either a mMBSR, CBT, or waiting group. Results from post-intervention evaluations demonstrated that mMBSR considerably outperformed the waitlist group across all six dimensions of mental health issues: depression, anxiety, somatization, or stress, sleeplessness, and pleasure perception. There was no statistically significant difference between the mMBSR and CBT groups on any of the six measures of mental health problems at the 6-month follow-up evaluation, while the two groups demonstrated continued progress from baseline. | There is a positive impact of an online brief modified mindfulness programme to reduce anxiety and symptoms. This impact is found to be statistically significant when compared to a negative control. The outcome is similar to that of a comparator, cognitive behaviour therapy programme. |

| Rubel et al., (2024) | A self-help intervention for GAD offered through the internet was the focus of this research. There was a two-arm | underway, those in the waitlist group were told to wait three weeks before receiving any professional psychotherapy. This randomised controlled trial comprised 156 patients with a diagnosis of generalised anxiety disorder (GAD) with internet access, ranging in age from 18 to 65 years old. Those who matched the | The control group shown no change in symptoms of generalised anxiety disorder, while the intervention group demonstrated a considerable effect size of improvement. In addition, there was a moderate effect size of improvement in | Results like these point to the efficacy of an internet-based self-help intervention in alleviating GAD symptoms and boosting general health. The possible processes underpinning this |
|----------------------|---|---|---|--|
| | randomised controlled experiment. | following criteria were considered for inclusion in the study: 1) age range of 18–65 years; 2) proficiency in German; 3) availability of continuous Internet connection; 4) willingness to participate through electronic informed consent; and 5) present diagnostic criteria for generalised anxiety disorder (GAD). There were two groups in the study: one that gained access to the online self-help program immediately (N = 78) and another that had to wait 12 weeks (N = 78). Online self-help software Selfapy can help with generalised anxiety disorder (GAD). The curriculum incorporates mindfulness-based therapy components, cognitive behavioural therapy exercises, and procedures supported by evidence. A foundational course with required and elective practice material and a series of individually | wellbeing among the intervention group as compared to the control group. | intervention's effectiveness and its long-term effects should be the focus of future studies. |

| Finnerty | University students | selectable, in-depth modular sections makes up the online course. It is accessible on mobile devices and the web. A five-block randomization | All three types of treatment—verbal | According to the findings, group |
|----------------|--|---|--|--|
| et al., (2023) | without a formal diagnosis of anxiety or depression were the subjects of a randomised control study that looked at the effectiveness of online group music therapy as a preventative measure for mental health issues. | approach was adopted. All four groups were present in each block. The three treatment groups met for 45 minutes once a week for six weeks in each block (except for the first block, which only lasted five weeks because of exam scheduling conflicts). For six weeks, students who volunteered to take part might be part of one of four groups:(1) active group music therapy, (2) receptive group music therapy, (3) standard of care, which was online group verbal therapy, or (4) control, which was no intervention. Before and after each therapy session, students used a smartphone app to measure their heart rate variability (HRV), as well as their stress and anxiety levels (Likert scale and State-Trait Anxiety Inventory, State version, respectively). | therapy, active music therapy, and receptive music therapy—saw a substantial drop in self-reported ratings between baseline and follow up. Also, a Bayesian ANOVA analysis revealed that there was no difference between the groups. This evidence shows that compared to the control group, there was a significant improvement in patients' anxiety symptoms. Additionally, when compared to an alternative intervention (standard care), the online therapy for anxiety had comparable effects. | music therapy has the potential to be just as beneficial as group verbal therapy. On top of that, the study proves that internet distribution is feasible, which lends credence to the notion that additional populations can benefit from remote therapy. |

Appendix III

Methodological Rigour Assessment

| | Wang et al., (2023) | Rubel et al., (2024) | Finnerty et al., (2023) |
|---|---------------------|----------------------|-------------------------|
| Did the study address a clearly focused research question? | Yes | Yes | Yes |
| Was the assignment of participants to interventions randomised? | Yes | Yes | Yes |
| Were the participants 'blind' to intervention they were given? | No | No | No |
| Were the investigators 'blind' to the intervention they were giving to participants? | No | No | No |
| Were the people assessing/analysing outcome/s 'blinded'? | Yes | Yes | No |
| Were the study groups similar at the start of the randomised controlled trial? | Yes | Yes | Can't Tell |
| Apart from the experimental intervention, did each study group receive the same level of care (that is, were they treated equally)? | Yes | Yes | Yes |
| Were the effects of intervention reported comprehensively? | Yes | Yes | Yes |
| Was the precision of the estimate of the intervention or treatment effect reported? | No | Yes | No |
| Do the benefits of the experimental intervention outweigh the harms and costs? | Can't Tell | Can't Tell | Can't Tell |
| Can the results be applied to your local population/in your context? | Yes | Yes | Yes |
| Would the experimental intervention provide greater value to the people in your care than any of the existing interventions? | Yes | Can't Tell | Yes |