Evaluating the Effectiveness of a Digital Mental Health Literacy Intervention for Children and Young People within a School Setting.

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Acknowledgements

2

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Table of Contents

Empirical Study

List of Figures

Systematic review

Empirical Study

Executive Summary

The current project investigates mental health literacy (MHL) and the effectiveness of MHL interventions with children and young people (CYP). Part one is a systematic review evaluating the effectiveness of MHL interventions for students at risk of developing eating disorders (EDs). Part two is an empirical study evaluating the effectiveness of a digital MHL intervention for CYP within a school setting. Part three integrates both sections and discusses their impact and the dissemination plan.

1. **Part one: A Systematic Review Evaluating the Effectiveness of MHL Interventions for Students at Risk of Developing Eating Disorders**

EDs such as anorexia nervosa (AN) and bulimia nervosa (BN) are common conditions causing significant psychological, personal, social and economic costs. Prevalence figures range between 0.3% and 0.9% for AN and 0.9% and 1.5% for BN (Smink, Hoeken et al., 2012) with EDs typically occurring in people during their teenage years to mid-twenties. There are effective evidence-based treatments available for EDs particularly for BN and its related disorders such as cognitive behavioural therapy (CBT). However, for the treatment of AN more research is still needed but CBT, the Maudsley anorexia nervosa treatment and specialist supportive clinical management are NICE (2017) recommended treatments.

Despite the availability of treatments, only 20-45% of individuals with EDs seek support and treatment for their difficulties (Forrest, Smith et al., 2017; Hart, Granillo et al., 2011). Treatments that are received are often focused on comorbid difficulties such

as depression and anxiety or weight loss rather than eating pathology. This can result in minimal improvements for the individual.

Early recognition of both AN and BN is found to be a significant factor in improving early intervention and treatment seeking. In addition, psychological treatments have been found to be more effective in the early stages of the disorders. One reason proposed for poor treatment seeking is that members of the public and those with EDs have poor MHL. MHL was first introduced by Jorm and colleagues in 1997 and has been defined as the 'knowledge and beliefs about mental disorders, which aid their recognition, management or prevention' (Jorm et al., 1997 p. 182). Jorm further expanded the definition to include attitudes such as stigma towards mental health disorders which impact recognition and help seeking behaviour.

Community studies have shown that individuals with EDs and members of the public demonstrate poor recognition of ED symptomology, avoid seeking professional help due to concerns around stigma and lack knowledge about where they can seek the appropriate professional help. Research also suggests that high levels of stigma are associated with increased levels of ED symptoms, lower self-esteem, greater length of the disorder and reduced help-seeking behaviour.

The transition from adolescence to adulthood is a period known to be susceptible to the development of EDs. This is a period where multiple changes are occurring including the development of autonomy, separating from parental influence and developing other social networks. In addition, the young adult is becoming more sophisticated at self-regulating their cognitive and emotional experiences.

Coincidentally this is the time when individuals start university or further education which in itself brings about additional stresses and pressures and can lead to the development of ED symptoms.

Over the years there has been growing concern about the mental health of students and institutions if they are not recognised and treated promptly. Indeed, research shows that EDs are pervasive in the student population compared to the general population with an estimated prevalence of between 8% and 17% (Hoerr et al., 2002; Eisenberg et al., 2011; Varela-Mato et al., 2012). In addition, student help-seeking is poor with as low as 10% of students reporting to have sought support for their problem (Surtees, Wainwright & Pharoah, 2000).

Given the low rates of recognition in the student population, high stigmatising attitudes and lack of access to timely and adequate treatment, there is a desperate need to provide preventative interventions which raise students' eating disorder MHL (ED-MHL) levels. Therefore, the current review aimed to critically appraise and synthesise evidence from research studies exploring the effectiveness of MHL interventions for students at risk of developing EDs.

A literature search of three online databases (PsycInfo, PubMed and Education Resources Information Centre (ERIC)) was conducted in January 2020 to consider articles published between 1997 and 2020 in this area.

Included studies were those that implemented an ED-MHL intervention assessing the effectiveness of the intervention with MHL outcome measures and were based in a

university setting with teenagers and young adults. Any delivery format and duration of the ED-MHL intervention was acceptable, but the content needed to include one of the following areas:

- symptoms of EDs and their related treatments;
- information related to engaging in help-seeking behaviour; and
- psychoeducational information about EDs.

The review identified eight studies which evaluated four components of MHL; stigmatising attitudes, recognition, help-seeking intentions/knowledge, and ED knowledge. The eligible studies were evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal tool for Randomised Controlled Trials (RCT) and the JBI checklist for Quasi-Experimental studies. A narrative synthesis was conducted to summarise and synthesise the findings of the included articles.

All studies were conducted in either Australia or the United States. Seven of the studies were quasi experimental and one was an RCT. All studies examined ED-MHL five of which focused on EDs in general and the remaining three were specific to AN. The length of interventions varied as did the delivery format across studies. A variety of outcome measures were utilised with few reporting the psychometric properties. Across the eight studies four MHL components were evaluated: stigma, help-seeking intentions/knowledge, ED recognition, and ED knowledge including aetiology, risk factors and treatment. Overall, half (n = 4) of the studies were rated as low quality and the remaining 4 studies were rated as medium quality. Quality scores ranged from 7 to 16. Due to the developing literature base, no studies were excluded on the basis of their quality ratings.

The overall findings for effectiveness of interventions showed that all eight studies demonstrated a significant improvement in at least one area of MHL compared to a controlled comparison group or pre intervention scores. Four of the six studies assessing stigmatising attitudes towards individuals with EDs showed a decrease in at least one stigma measure following the interventions. Two studies assessed MHL interventions to improve intentions/knowledge towards help-seeking and found mixed results. Overall MHL interventions were successful in improving recognition of EDs with all four studies demonstrating improvements. Three studies assessed different aspects of ED knowledge with all three showing a significant improvement following their respective ED-MHL intervention. Finally, two studies evaluated aetiology of EDs, and one study assessed risk factors with all studies showing a significant improvement following the ED-MHL interventions.

Limitations, clinical implications and future research are outlined. These include the need for methodologically robust ED-MHL interventions to improve young adults MHL in addition to more rigorously controlled studies, such as RCT's with controlled comparison groups and psychometrically robust outcome measures.

2. Part Two: Evaluating the Effectiveness of a Digital MHL Intervention for CYP within a School Setting

Childhood and adolescence are a critical period for the development of mental health problems, with 10-20% of CYP affected worldwide (Kieling et al., 2011). Mental health

problems left untreated can lead to detrimental effects on CYP's individual, social, cognitive and emotional development.

Early promotion, prevention and intervention provide opportunities for CYP to access services before mental health problems escalate and cause long term difficulties. Research suggests that intervening at an early stage can result in improved long-term outcomes for young people. Whilst there are specialist child and mental health services available for children, access to treatment can be difficult and wait times lengthy and support is often limited to those with severe and enduring mental health difficulties.

Despite some provision of services being available, a substantial proportion of CYP do not access treatment. One common barrier reported to treatment seeking for CYP is stigmatising attitudes. In addition, research suggests that improvements in knowledge and recognition of mental health problems can encourage appropriate help-seeking.

As such, mental health literacy (MHL) interventions have been found to be an effective means of improving CYP's MHL. The term MHL refers to individual's knowledge about mental health disorders including their recognition of symptoms and their knowledge of appropriate treatments, and how to manage and prevent them. It also refers to attitudes such as stigma towards mental health disorders, which reduce recognition of mental health problems and help-seeking behaviour (Jorm, 2012). Whilst this definition is often thought of as the 'gold standard,' arguments have been made for its

expansion. However, there is concern regarding how MHL should be defined and measured (Spiker & Hammer, 2018; Wei et al., 2015).

Empirical studies have demonstrated that CYP have poor MHL levels. For example, several studies utilising a vignette methodology have demonstrated that adolescents have poor recognition of depression, psychosis and conduct disorder and demonstrate poor help-seeking intentions for a friend and for themselves (Wright et al., 2005; Kelly et al., 2007).

The education system is in a prime position to promote and protect CYP's mental health. Schools have been identified as a crucial site for interventions as they provide the opportunity for social and emotional growth and can normalise mental health difficulties as part of education. Furthermore, schools are in an ideal position to identify changes in the CYP they work with given that these young people spend the majority of their time at school where they can develop trusting and supportive relationships with teachers. In 2017, the UK Government issued the Green Paper which endorsed the implementation of mental health first aid (MHFA) within all secondary schools (HM Government, 2017), with the aim of increasing MHL.

To date, studies have demonstrated preliminary evidence that face to face MHL interventions can be effective in improving MHL in CYP, resulting in increased knowledge about mental health problems, desirable help-seeking behaviours and reduced stigmatising attitudes. Further studies have found that an increase in mental health knowledge can significantly predict positive attitudes towards mental health (i.e. reduce stigmatising attitudes).

Similarly, online digital MHL interventions with CYP conducted in school settings have found significant improvements in their MHL, help-seeking behaviour and mental well-being. However, most studies evaluated anxiety and depression and did not include behavioural difficulties and EDs which epidemiological studies have shown to be prevalent among CYP. Therefore, while studies have shown an effectiveness for digital mental health interventions, it is unknown whether these results would be replicated across a range of mental health difficulties in CYP.

The current empirical project had one overarching aim and several related hypotheses: to evaluate the effectiveness of a digital MHL intervention, MindAid Youth in improving;

    (i)   CYP's disorder related knowledge (across conduct disorder, depression, social anxiety and eating disorders);

    (ii)   help-seeking awareness and;

    (iii)   stigmatising attitudes compared to a control group who received no MHL intervention.

MindAid Youth is a digital training tool created using evidenced based resources, which has been designed to support CYP improve their knowledge and skills about mental health. It comprises 4 key features; talk, quiz, library and help, all of which the CYP can navigate through. The current study utilised an experimental, longitudinal pre-post cluster control design. School students were recruited through research and clinical databases of schools, as well as personal contacts across a number of London based schools. Schools self-selected whether they wanted to participate in the control

or intervention arms of the study, which facilitated engagement and retention of schools.

A total of 5 schools and 321 students participated in the study. Participants' age ranged from 10-13 years of age. Both control (n=127) and intervention (n=204) groups completed three questionnaires at baseline (week 1); a demographic information sheet, four vignettes of common mental health disorders and a stigma scale to evaluate the effectiveness of MindAid Youth. The intervention group subsequently completed 4 weeks of MindAid Youth and the control group remained in their normal Personal Social, Health and Economic (PSHE) lesson. At post intervention both groups completed the vignettes and stigma scale (week 6).

The results showed that the implementation of a digital MHL intervention at school significantly improved CYP's MHL knowledge of conduct disorder, depression and eating disorders from pre to post intervention compared to the control group. The results found there was no significant differences in MHL knowledge of social anxiety at post intervention between groups. The results also showed that there was no significant difference from pre to post intervention between groups in help-seeking awareness, which was found across all four disorders. There were no significant differences found in stigmatising attitudes from pre to post intervention between the control and intervention groups.

Previous research is discussed in relation to the empirical study findings. A limitation of the study was the use of unstandardized vignettes; however, they have been widely used in research with CYP. Future studies should prioritise the development and

validation of outcome measure for CYP. Iterations of the MindAid Youth intervention would be of benefit to research, as well as conducting RCT's with follow-up periods to assess the long-term impact of the intervention.

The clinical implications of the results are discussed. These include the finding that whilst young people's knowledge of the majority of disorders was improved, help-seeking awareness showed no improvements between groups. Thus, suggesting the need for continued government initiatives for promoting CYP's MHL to support them in seeking help during a period of heightened vulnerability.

3. **Part Three: Integration, Impact and Dissemination plan**

The current project aimed to increase the MHL of CYP in a school setting by implementing a novel digital MHL intervention, MindAid Youth. It also systematically evaluated the effectiveness of ED-MHL interventions for students at risk of developing EDs. The empirical study showed that MindAid Youth was effective in improving MHL knowledge for conduct disorder, depression and EDs however, no differences in help-seeking awareness was found between groups across the four disorders. In addition, no significant differences between groups on stigmatising attitudes was found post intervention. The systematic review overall showed that for all 8 studies improvements were found in at least one area of MHL. Studies varied in their use of control groups, incorporating follow-up periods and use of standardised measures. Overall the results show that digital MHL interventions can be effective in improving MHL of CYP. These results together suggest the continued need for more methodologically robust digital

MHL interventions using standardised outcome measures and incorporating follow-up periods to determine the interventions long term effects.

Mental health problems are common in CYP, however there are low rates for treatment seeking found for these young people. Improved outcomes are often seen for those who do access early intervention. Supporting CYP in improving their MHL is one way in which early recognition can be improved. The education system is in a prime position to support early promotion and prevention efforts given the new government requirement for MHL interventions to be implemented in all schools by 2022/23. Face to face MHL interventions have been shown to be successful in improving CYP's recognition, knowledge, help-seeking and stigma. However, with the increased use of technology, and the cost-effective benefits of widespread access to multiple people, there is a focus on the development of digital MHL interventions. These interventions have shown variable results, but further research is needed with more rigorously controlled studies before conclusions on their effectiveness can be made.

This research project has impacted multiple beneficiaries including participating schools as a whole, teachers and students, reflections and recommendations are offered. MindAid Youth, a digital MHL intervention showed promise, demonstrating that following the intervention CYPs knowledge of a range of mental health problems improved. Teachers also enquired about raising their MHL levels in order to support their students and feel confident in delivering the intervention. Therefore, it will be imperative that teachers are supported to develop confidence and skills to teach these interventions effectively. In order to support this a whole school approach has been recommended. Senior leaders need to create space in the academic curriculum to

facilitate the running of MHL interventions as well as the allocation of additional funding and resources if the government's aim is to be achieved. As research progresses it will be important to think about factors such as gender and ethnicity and how interventions can be tailored to those to ensure they're most effective.

Summaries of the research project findings will be disseminated to the participating schools, parents and CYP. In addition, the empirical findings of the study will be presented by my research supervisor at the International Society for Research on Internet Interventions. The systematic review and empirical paper may be published in journals such as the BMC Public Health or International Journal of Mental Health Systems. MindAid Youth has been made available to schools who participated as a control, and discussions are ongoing with another school regarding assistance with increasing their teachers' MHL levels.

Part II: A systematic review

A systematic review to evaluate the effectiveness of mental health literacy interventions for students at risk of developing eating disorders.

Abstract

Introduction: Eating disorders (EDs) such as anorexia nervosa (AN) and bulimia nervosa (AN) are common conditions causing significant psychological, personal, social and economic costs and are well documented in the university population (Hay & Mond, 2005). Only recently has mental health literacy (MHL) been systematically considered for mental health problems such as EDs. This has resulted in little information being available to support health promotion and early intervention programmes targeted at EDs. The review aimed to evaluate the effectiveness of MHL interventions for university students at risk of developing EDs.

Method: A literature search of three online databases (PsycInfo, PubMed and Education Resources Information Centre (ERIC)) was conducted between 1997 and January 2020. Studies were evaluated using the Joanna Briggs Institute (JBI) Critical Appraisal tool for Randomised Controlled Trials (RCT) and the JBI checklist for Quasi-Experimental studies (Tufanaru et al., 2017). Due to the limited number of studies published in the field all eligible studies were included, regardless of their quality rating. A narrative synthesis was conducted to summarise and synthesise the findings of the included articles.

Results: The review evaluated eight studies. The studies provided some evidence for the effectiveness of ED related MHL interventions. Improvements were demonstrated across stigmatising attitudes, recognition of EDs, help-seeking intentions/knowledge, and ED knowledge. The review identified concerns about the psychometric properties of measures employed and the methodological rigour of studies.

Conclusion: There is a continued need for methodologically robust ED-MHL interventions in order to improve recognition, help-seeking intentions/knowledge and knowledge of EDs for individuals at risk of developing EDs. Future research should focus on conducting more methodologically sound studies including RCTs, studies with controlled comparison groups and focus on evaluating the psychometric properties of measures.

1. Introduction

Anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED) are the most common forms of eating disorders (ED) with an estimated 1.25 million people in the United Kingdom affected (Beat, 2017). Population surveys in the United Kingdom show prevalence figures of between 0.3% and 0.9% for AN, 0.9% and 1.5% for BN and 1.5% and 1.9% for BED (Smink, Hoeken & Hoek, 2012). The development of EDs typically occurs in people during their teenage years to mid-twenties, with the average age of onset for AN being 16-17 years, and 18-19 years for BN (Hudson et al., 2007; Micali et al., 2013). Given the typical age of onset of EDs, it is unsurprising that they have been well documented in the student population, with about 20% of students reporting having experienced an ED at some point during their lives (NEDA, 2006, 2009). Furthermore, 75% of these students reported never having sought support for their eating disordered behaviours (NEDA, 2006).

AN and BN are severe psychiatric disorders which involve an unhealthy preoccupation with food. The current review utilises the most commonly used definition of AN and BN which are outlined in the Diagnostic Statistical Manual, 5th Edition (DSM-V; Appendix A). The criteria for AN includes the restriction of food intake to prevent weight gain resulting in 'low body weight' given the persons age, sex and height. There is an over preoccupation and fear of gaining weight, and this is accompanied by a distorted view of their body weight and shape. The criteria for BN are recurrent episodes of binge eating followed by compensatory strategies to prevent weight gain. Large amounts of food are consumed in a discrete period of time and the individual experiences a sense of lack of control during this period. Their evaluation of

themselves is unduly influenced by body shape and weight (APA, 2013). The current review does not include BED despite it being highly prevalent in the population as no studies investigated it.

The DSM criteria were utilised as they are the most commonly referred to definition of eating disorders. It was preferred over the use of the ICD-10 as the DSM criteria are considered more accurate, more reliable in a statistical context, and provides operational criteria with distinct definitions for each condition (First, Rebello, Keeley et al., 2018). However, it is recognised that the DSM can oversimplify human behaviour, increases the risk of misdiagnosis or over-diagnosis and can reduce individuals to labels which can be stigmatising. It is also important to take a person centred, holistic approach when working with individuals (Johnstone & Boyle, 2018). Nevertheless, diagnoses do provide a means of communication between colleagues regarding disorders and helps guide research in the mental health field ensuring that the same disorder is being studied (Pickersgill, 2014). In addition, it was important for the research methodology to have a clear and consistent definition of the disorders being taught in the mental health literacy application. For the purpose of the review the DSM criteria was adhered to as the research literature referred to it as such.

This systematic review investigates eating disorder mental health literacy (ED-MHL) interventions targeted at students at risk of developing EDs. Given the high prevalence of EDs in students and the personal, social and economic costs caused by the disorder, there is a serious need for effective treatments to be provided for students with EDs (Hay & Mond, 2005; Begg et al., 2007). The low rates of recognition in this population, high stigmatising attitudes and lack of access to timely and adequate

treatment attests to the need to provide interventions which raise student's ED-MHL levels (Evans et al., 2011; Mond et al., 2007). Therefore, the current systematic review aims to evaluate the effectiveness of ED-MHL interventions for students at risk of developing EDs.

To begin it summarises the psychological and physical complications related to EDs. Second, it discusses treatment options for EDs, and uptake of treatment by individuals with a diagnosed ED. Third, it outlines the developmental challenges experienced by young adults at this time, coupled with the challenges of starting university. Fourth, it discusses the concept of MHL and how it is related to poor treatment uptake. After which the following MHL concepts are discussed in relation to research findings: stigmatising attitudes and help-seeking, recognition of EDs, and ED knowledge. Finally, leading to the aims and focus of the current systematic review.

1.1 Psychological and physical complications

In addition to the sequelae of physical complications related to EDs (Rome & Ammerman, 2003) EDs also cause significant psychological, personal, social and economic costs (Hay & Mond, 2005). Individuals with EDs are more likely to demonstrate higher levels of psychological distress (e.g. K-10) compared to the general population (Darby, Hay, Mond, Rodgers & Owen, 2007), on measures of mental and physical functioning (SF-32 or SF-12; Mond, Rodgers et al.,2004; Spitzer et al., 1995; Mond et al., 2005), and report poorer quality of life (e.g. WHOQOL) (Hay & Mond, 2005; Mond et al., 2005). Individuals with EDs are also more likely to be

diagnosed with comorbid mental health problems such as depression and anxiety (Fischer & Le Grange, 2007; Godart et al., 2003), engage in self harming behaviours (Sansone & Sansone, 2006), and to commit suicide (Sansone & Levitt, 2002).

1.2 Treatment options and uptake

There are effective evidence-based treatments available for EDs, particularly for bulimia, BED and its related disorders (Hay, Bacaltchuk and Stefano, 2004; Berkman, Lohr & Bulik, 2007), such as cognitive behavioural therapy (CBT) (NICE, England and Wales, 2017; Garner & Garfinkel, 1997). For the treatment of AN however, more research is needed (Claudino et al., 2006; Fisher, Hetrick, & Rushford, 2010; Hay et al., 2015; Vanderycken, 2003). However, NICE (2017) recommended treatments include CBT, the Maudsley anorexia nervosa treatment and specialist supportive clinical management.

Despite the available treatments on offer, less than one quarter of those suffering with an ED actually seek evidence-based support for their difficulties (Bijl & Ravelli, 2000; Hudson et al., 2007; Jacobi et al., 2004; Oakley Browne, Wells, & McGee, 2006, Hart et al., 2011). When individuals do receive treatment it's often focused on weight-loss or comorbid mental health problems such as anxiety or depression, rather than treatment targeted at eating pathology (Mond et al., 2007a). These are treatments which are unlikely to be of benefit in reducing individuals' ED symptoms (Mond et al., 2007a).

Importantly, early recognition of both AN and BN is found to be a significant factor in improving early intervention and treatment seeking, and psychological treatments have been found to be more effective in the early stages of the disorders (Keski-Rahkonen et al., 2006; Mond et al., 2008). Thus, this provides further evidence attesting to the need for early preventive interventions for individuals at risk of EDs.

1.3 Developmental challenges for young adults and educational setting

As mentioned above, EDs typically emerge during early and late adolescence when individuals are transitioning to adulthood (Keel et al., 2007; Stice et al., 2009). During this period individuals become more autonomous, developing further their cognitive abilities, taking on more responsibilities and independence, and separating from parental relationships and developing other social bonds. This is coupled with the progressive consolidation of self-identify (Inguglia et al., 2015). As such, these young adults are progressively self-regulating their cognitive and emotional experiences and therefore cannot be assumed to have the same cognitive processes or abilities as adults (Zimmer-Gembeck & Collins, 2003).

At this time many individuals start university or further education which can bring about additional stress, sometimes leading to high levels of distress and the development of ED symptoms (Fitzsimmons-Craft et al., 2019). Internationally there has been growing concern about students' mental health and the impact it could have on students and institutions if symptoms are not recognised and treated early (Shuchman, 2007; Stallmann, 2010).

Research has shown that EDs are pervasive in student populations, with an estimated prevalence of between 8% and 17% (Hoerr et al., 2002; Eisenberg et al., 2011; Varela-Mato et al., 2012), and higher among this population compared to the general public (Eisenberg et al., 2011)**.** In addition, student help-seeking attempts appear to be poor, with one study showing that only 10% of students who had a mental health problem reporting seeking help from support services (Surtees, Wainwright & Pharoah, 2000). These results further provide evidence for the need for ED promotion, prevention and treatment programmes targeted towards this at-risk population (Spence, Owens-Solari & Goodyer, 2016) and to determine which of the ED-MHL interventions are most effective.

1.4 MHL and reasons for poor treatment uptake

MHL may be critical in helping clients receive treatment at the right time, and that is important when we're understanding uptake of EDs. A number of reasons have been proposed for poor treatment uptake and adherence. One reason being that individuals with EDs and members of the public have poor ED-MHL (Jorm et al., 2000; Hepworth & Paxton, 2007). The term mental health literacy (MHL) was introduced in 1997 by Jorm and colleagues and has been defined as the 'knowledge and beliefs about mental disorders, which aid their recognition, management or prevention' (Jorm et al., 1997, p. 182). It also includes attitudes such as stigma towards mental health disorders which impact recognition and help seeking behaviour (Jorm, 2012).

Jorm and colleagues have argued this shows that members of the public lack awareness of the symptoms of mental health problems, how to prevent them, and how

best to respond to them, including what treatments are evidence based and most effective, and where to seek support from for them (Jorm et al., 1997). Jorm (2012) has also emphasised that this is not the same in the physical health literature where the importance and value of recognising and understanding signs and symptoms of health difficulties, taking preventative measures and being aware of treatments available is considered beneficial. Research suggests that early identification and intervention of mental health problems can lead to improvements in MHL and possibly early help-seeking (Kelly, Jorm & Wright, 2007). It has only been in recent years that MHL has attracted the attention of researchers and has been systematically applied to mental health problems such as EDs (Mond et al., 2004). As a result, there are limited studies and little information pertaining to the effective ingredients to inform early intervention and health promotion programmes.

Within MHL, several components of MHL have been indicated in adversely affecting treatment seeking and adherence. Each component of MHL will be discussed in turn.

1.5 Stigma and help-seeking

Research suggests that the public and individuals with eating disordered behaviour have stigmatising beliefs and attitudes about individuals with EDs. One study found that one third of the British population view people with EDs as difficult to communicate with and believe their ED is self-inflicted (Crisp, 2005). Other studies exploring stigmatising attitudes about EDs have found that people believe individuals with EDs use their illness to gain attention (Roehrig & McLean, 2010; Mond, Robertson-Smith & Vetere, 2006) and that they do not need proper treatment, believing that it might not

'be too bad' having an ED given that you could lose weight (Mond, Robertson-Smith & Vetere, 2006; Mond et al., 2008).

Mond et al., (2004) found that a community sample of women reported that having BN would be distressing and difficult to treat. However, some participants believed that bulimic behaviours were normal and even desirable. Similar findings were found for a sample of women with bulimia type EDs (Mond et al., 2008). Roehrig and McLean (2010) investigated people's attitudes towards individuals with EDs and found there were greater stigmatising attitudes compared to those towards depression.

In contrast, Brownlow et al., (2015) investigated the effectiveness of an online training programme designed to improve health professionals' knowledge and skills in treating EDs, and to improve stigmatising attitudes. They found significant reductions in health professionals' stigmatising attitudes around EDs, and significant improvement in their knowledge of EDs at post intervention. Research suggests that increased levels of stigma are associated with higher levels of ED symptoms, lower self-esteem, greater length of the disorder and reduced help-seeking behaviour (Griffiths, Mond, Murray and Touyz, 2014a). This suggests the need for prevention programmes targeting stigmatising attitudes towards individuals with EDs (O'Connor et al., 2016).

Individuals with EDs have been found to avoid seeking professional help due to concerns about stigma (Hacker et al., 2010; Hepworth & Paxton, 2007). In the same study mentioned above (Mond et al., 2010), participants were asked what treatments they felt would be most beneficial and who they would seek help from in the first instance if they experienced those problems. The findings showed that women at high

risk of EDs or symptomatic were less likely to seek help if they considered themselves to have BN or ED symptoms than low risk participants. The primary reason given was because they were fearful of divulging this information to anyone.

Symptomatic participants were also more likely than at risk participants to believe that BN was common, viewing it as acceptable behaviour and believing that individuals with BN would be discriminated against. These results indicate that those at high risk of developing an ED and symptomatic individuals would be less likely to seek help if they had symptoms of BN because they would not want to tell someone. Furthermore, symptomatic participants feared they'd be discriminated again. This is of particular interest given that fear of stigma is a major barrier to individuals with EDs seeking help (Hepworth & Paxton, 2007).

1.6 Recognition of eating disorders

Community studies have demonstrated members of the public and individuals with EDs have poor recognition of ED symptomology, and recognition is thought to play an important role in treatment seeking (Jorm, 2000; Reavely & Jorm, 2011). For instance, Mond et al., (2010) investigated womens' attitudes and beliefs in relation to the nature and treatment of bulimia for women who were at low to high risk of EDs and those already presenting with ED symptoms. Participants were presented with a vignette depicting a fictional character suffering from BN and were asked to indicate the problem. The results indicated that participants' recognition of BN was poor with only 21.1% of participants in the low risk group identifying BN as the primary problem,

19.8% identifying BN in the high-risk group, and 24.5% of symptomatic participants recognising BN.

Other studies have found similar findings. For example, in a population sample of 5,255 females, where a subsample (n=158) of participants with high symptoms of BN used the same vignette methodology found that only 18.5% of participants recognised the main problem as BN (Mond et al., 2008). These studies collectively show that the population have poor recognition of BN, as do symptomatic individuals. In addition, recognition of BN is also poor among women in the community (Mond et al., 2004).

1.7 Eating disorder knowledge

Another factor contributing to low or inappropriate help-seeking is the publics lack of knowledge about which professionals and services are most appropriate to seek treatment from regarding eating disordered behaviour (Friedman, 2009; Nolen-Hoeksema, 2006). For example, Haller et al., (2009) found a relationship between having correct knowledge of appropriate treatment for mental health problems, and utilising evidence-based treatment.

Another study supported these findings with a community sample of females who were asked for their views on helpful interventions for bulimia nervosa (Mond et al., 2004). Participants were presented with a vignette describing a character who met DSM-V diagnostic criteria for binge-purge type ED. Participants thought that seeking treatment from a general practitioner (GP), counsellor or dietician would be preferable to treatment from mental health specialists such as psychologists or psychiatrists.

Participants also endorsed the use of vitamins and minerals and only a minority thought anti-depressants would be helpful. These views are held despite the research literature suggesting that the most effective treatment is a combination of psychological interventions (e.g. CBT) and antidepressants (Hay, Bacaltchuk & Stefano, 2004).

A similar vignette methodology depicting a girl with BN was used with a sample of 522 female high school students. The students were asked a series of questions relating to the treatment of BN and treatment seeking for the problem described. Results corroborated the above findings, showing that high school students demonstrated inappropriate knowledge of help-seeking; self-help strategies were favoured over mental health professionals, and students were ambivalent about the use of antidepressants (Mond, et al., 2007).

1.8 Review aims

Overall the evidence suggests that EDs are highly prevalent in the student population and come with psychological, social and economic costs. In addition, given that the population and individuals with EDs demonstrate poor recognition of EDs this suggests the need for early promotion and prevention programmes designed to improve ED-MHL. This may in turn encourage individuals to access early and appropriate treatment (Mond et al., 2010b). Moreover, the general population along with symptomatic individuals would benefit from these interventions targeting stigmatising attitudes around EDs, as these have been found to be a major barrier to

treatment seeking. Furthermore, individuals need to be skilled up on knowledge of effective evidence-based treatments and be aware of the appropriate professionals from whom to seek support for their EDs (Begg et al., 2007; Hay & Mond, 2005).

To date, no systematic review had been conducted to evaluate the effectiveness of MHL interventions for university students at risk of developing EDs. Such a review could helpfully inform the development of health promotion and prevention programmes within University settings and may ensure those with ED symptoms get early help. The current review will systematically identify, critically review and synthesise evidence from research studies that explore the effectiveness of ED-MHL interventions at university for teenagers and young adults at risk of developing EDs. It will focus on all aspects of MHL as defined by Jorm (1997; 2012), stigmatising attitudes, help-seeking intentions/knowledge, ED recognition, and other ED knowledge regarding aetiology, risk factors and treatment.

The aim of this systematic review was to evaluate the effectiveness of ED-MHL interventions for young people in University settings, specifically investigating the following questions:

1. To what extent do ED-MHL interventions improve students' stigmatising attitudes towards EDs?

2. To what extent do ED-MHL interventions improve students' help-seeking intentions or knowledge?

3. To what extent do ED-MHL interventions improve students' ED recognition?

4. To what extent do ED-MHL interventions improve students' ED knowledge regarding aetiology, risk factors and treatment?

1. Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, 2009).

1.1 Eligibility criteria

This review sought to examine research studies that explored the effectiveness of MHL interventions at university for teenagers and young adults at risk of developing an ED. The search was limited to studies published after 1997. The inclusion criteria were as follows:

Participants:

- teenagers and young adults aged 17 years old and above who were enrolled for any subject at university; and,
- eligible studies looked at populations of teenagers and young adults with an ED diagnosable through the Diagnostic and Statistical Manual 5 (DSM-5; Association, 2013), and comparison groups without EDs.

Methodology:

- eligible studies included randomised controlled trials, cluster randomised controlled trials, uncontrolled trials, quasi-experimental studies and interventions with pre-post comparisons. A wide range of designs were included in the review due to the infancy in the field.

Intervention:

- evaluation of an ED mental health literacy intervention delivered in any format (e.g. face to face), by any professional or teacher at university;

- mental health literacy interventions which included at least one of the following topic areas;

- symptoms of eating disorders and their related treatments, information related to engaging in help-seeking behaviour, psychoeducational information about eating disorders; and

- studies needed to include one of the following outcomes: knowledge and recognition of eating disorders and their treatments, knowledge of help-seeking or actual help-seeking behaviour, stigmatising attitudes towards mental illnesses, and risk factors or causes of eating disorders.

Language:

- studies available in English.

The exclusion criteria were:

- literature reviews, qualitative studies, theoretical essays or commentaries.

1.2 Search strategy

A search of the literature was conducted for studies published between 1997 and January 2020 as this was when the concept of MHL was first introduced by Jorm and

colleagues (Jorm et al., 1997). As a result, there are no studies in the literature pertaining to this concept prior to 1997. Three databases were searched: PsycInfo, PubMed and Education Resources Information Centre (ERIC) using the following search terms which can be viewed in Table 1.

Table 1

Search terms

Search category	Terms used
Mental health literacy	"mental health literacy" OR "help-seeking" OR "attitude*" OR "stigma* attitude*" OR "mental health knowledge"
Programme	"treatment*" OR "programme*" OR "education" OR "training" OR "prevention program*" OR "prevent*"
Adolescents	"adolescen*" OR student*" OR "young adult*" OR "young people" OR "teen*" OR "young person*" OR "child*" OR "uni*" OR "university student*"
Eating disorders	"eating disorder*" OR "anorex*" OR "bulimi*" OR "binge eating disorder" OR "anorexia nervosa" OR "bulimia nervosa"

2.3 Search Results

An initial database search was run, and records exported from each search engine to Zotero. Duplicates were removed and remaining articles were imported to Excel where titles and abstracts were screened for eligibility. Searches of the three databases identified a total of 1,800 articles. Once duplicates were removed a total of 1,628 articles remained. During screening of titles 1,274 articles were found not to meet

inclusion criteria and were excluded. Some of the common reasons they did not meet the inclusion criteria were because the studies did not focus on EDs, instead focusing on obesity, weight or exercise, or they were intervention studies utilising CBT or psychodynamic therapies. Following screening of abstracts, 302 were further excluded leaving 52 full text articles to review for eligibility. Of the 52 full articles, 8 were found to meet inclusion and exclusion criteria and included in the following review. One study included both university students and teaching staff and was retained due to the small sample size of teachers (n=20) and the limited number of studies in the field. A thorough and comprehensive review was conducted utilising three databases. Reference lists of cited articles were searched, and no other relevant articles were found likely reflecting the emerging nature of the field and lack of studies in the area. Figure 1. highlights the selection process.

To reduce the risk of bias, a second reviewer independently screened 10% of titles and abstracts following removal of duplicates (n = 163) to determine eligibility. The inter-rater agreement between the two raters was Kappa = .76, indicating a moderate level of agreement (McHugh, 2012). Discrepancies were resolved through discussion with the second reviewer.

Figure1.

PRISMA Flow diagram
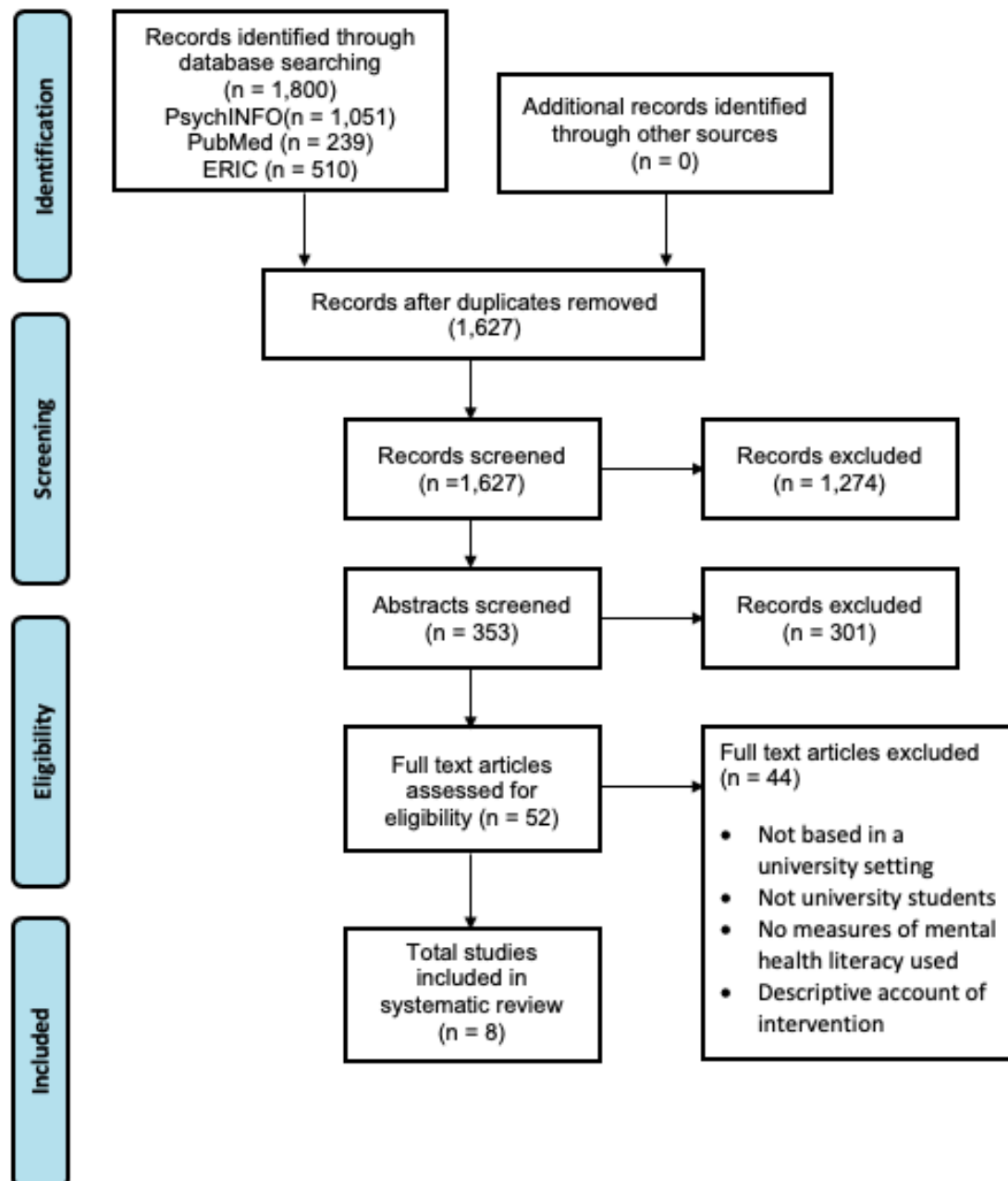
2.4 Data extraction

The following information was taken from each study in line with previous systematic reviews (Wei et al., 2013; Tay et al., 2018): (1) author, year of publication and study location, (2) sample size, (3) study design, (4) participant characteristic including age and gender, (5) intervention type and duration, (6) outcome measures, (7) key results.

2.5 Study quality assessment

The methodological quality of the 8 included studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal tool for Randomised Controlled Trials (RCT) to assess RCTs (Tufanaru et al., 2017). To assess non-randomised experimental studies the JBI checklist for Quasi-Experimental studies was used (Tufanaru et al., 2017). The JBI for RCTs and for Quasi-experimental studies outline a number of criteria (criteria noted in Table 2 and 3) for evaluating the quality of studies covering areas including design, conduct and analysis outcomes.

As the JBI does not define the quality scoring system of articles, the same judgement rating was adopted as other published papers in the area (Tay, Tay & Klainin-Yobas, 2018; Scully, McLaughlin & Fitzgerald, 2019). Each study was rated a judgement as follows: yes (2), unclear (1), no (0), not-applicable (NA), and given a quality assessment score out of 26 if an RCT and a score out of 18 for the Quasi-Experimental studies.

Table 2 and Table 3 present the quality assessment checklist for both types of studies in which scores of 24-26 were considered high quality, scores of 22 and 23 were considered medium quality and scores of 21 and below were considered low quality for the RCT. Scores of 16-18 were considered high quality, scores of 14 and 15 were considered of medium quality and those scoring 13 and below were considered low quality for the Quasi-Experimental Studies.

2.6 Planned method of analysis

The heterogeneity of the included studies in terms of interventions, design, and outcome measures prevented a meta-analysis from being conducted. To address the review aims, a narrative synthesis was conducted to summarise, synthesise and critique the findings of the included articles in line with guidance from Campbell et al., (2020) and Boland, Cherry & Dickson, (2017). This involved: identifying and tabulating key information and results across studies and organising according to methodological quality. This was followed by organising studies according to Jorm et als., (1997; 2012) MHL components specifically applied to eating disorders. These included: stigmatising attitudes, help-seeking intentions/ knowledge, eating disorder recognition and eating disorder knowledge regarding aetiology, risk factors and treatment. The findings were ordered in this way in order to best answer the review question and help identify limitations in current evidence to support the MHL model. Subsequent to this a standard metric was determined to draw comparisons across studies (e.g. P values). After which study quality ratings were used to prioritise the weight given to findings from studies evaluated as higher quality. Next, differences in heterogeneity across study findings were reflected on and inferences drawn about the certainty of evidence

based on the quality of findings and consistency of effects across studies. Finally, an overall critical synthesis of study findings was provided along with the limitations of the synthesis methods and how these affect the conclusions which can be drawn.

1. Results

3.1 Study quality assessment

Overall, four of the studies were rated as low quality, and four were rated as medium quality. Quality scores using the JBI criteria ranged from 7 to a maximum score of 16 with a mean score of 12.6. The most common problems in regard to quality for the quasi-experimental studies were lack of a control group and lack of clarity on the reliability of measurements. Thus, extraneous variables could account for any significant effects observed over time for the included studies. Reducing the conclusions which may be drawn about the role of the interventions in producing improvements on particular measures.

For the RCT the areas that reduced overall quality of the study included allocation concealment, blinding of interventions, blinding of outcome assessors, lack of appropriate statistical analysis and where the process of blinding of participants and reliability of outcomes were unclear. Due to the lack of studies in the area, no studies were excluded on the basis of the quality assessment ratings, and therefore all studies were included in the review. Table 2 and 3 outline the quality assessment ratings for RCT and Quasi-Experimental studies.

Table 2

Risk of Bias for RCT

Author	Bias													
	Randomization process	Allocation concealment	Similarities at baseline	Blinding participants	Blinding interventionists	Blinding outcome assessors	Similarity of treatment between groups	Attrition follow-up	Groups analysed in their specific groups	Similarity of outcomes for different groups	Reliability of outcomes	Appropriate statistical analysis	Appropriateness of trial design	Overall Quality Rating
Bannatyne and Stapleton (2015)	+	-	+	?	-	-	+	+	+	+	?	-	+	Low Quality

Key: +: yes (2); -:no (0); ?: unclear information (1); N/A: not-applicable (0)

Table 3

Risk of Bias for Quasi-Experimental Studies

Authors	Bias									
	Intervention determined effect?	Similarities at baseline	Similar care rendered to participants?	Presence of control group	Multiple measurements pre-post intervention?	Attrition follow-up	Outcomes measured similarly between groups?	Reliability of measurements	Appropriateness of statistical analysis	Overall Quality Rating
Gratwick-Sarli and Bentley (2014)	+	NA	NA	-	+	-	NA	?	+	Low Quality
Tillman, Sell, Yates, and Mueller (2015)	+	+	NA	-	+	+	NA	?	+	Low Quality
Duffy and Henkel (2016)	+	+	NA	-	+	-	NA	?	+	Low Quality
Hart, Jorm and Paxton (2012)	+	+	NA	-	+	+	+	+	+	Medium Quality
Sebastian, Richards, and Bilgin (2017)	+	+	+	-	+	+	+	?	+	Medium Quality
Sebastian and Richards (2017)	+	+	+	-	+	+	+	?	+	Medium Quality
Torres-McGehee, Green, et al. (2011)	+	-	+	+	+	+	+	-	+	Medium Quality

Key: +: yes (2); -:no (0); ?: unclear information (1); N/A: not-applicable (0)

3.2 Study characteristics

Table 5 provides details of study characteristics and main results of the studies included in this review. All studies were published between 2011-2017 and were conducted in Western countries, five studies were conducted in Australia and three in the United States. Of these studies seven were quasi-experimental, and one was an RCT.

3.3 Participant characteristics

The total number of participants of the included studies was 964, ranging from 40 – 245 (mean: 120.5; median: 126.5). All studies took place in a university setting with three studies including undergraduate psychology students, one study including undergraduate nursing students, one study including medical students, one university auxiliary dancers, and two studies did not specify the subject's participants studied. Participants were teenagers and young adults with age reported in seven of the included studies ranging from 17 - 46 years[1]. [1]Participant gender was reported in seven of the included studies with the percentage of female participants ranging from 40% – 100% (mean: 73.4%; median: 84%). Only one study reported that participants had previous experience of MHL training (n=5). Three studies did not report on the presence of mental health problems within the sample, four studies removed

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[1] One study was excluded as it was a mixed sample of young people and teachers and their ages were not reported separately

participants with histories of EDs prior to commencement of the trial, and one study reported that 14% of their sample had high levels of eating concerns.

3.4 Type of intervention

All eight studies included in the review examined ED-MHL. Five of the eight studies focused on eating disorders in general[3,4,6,7,8] and the remaining three studies targeted AN only[1,2,5]. The length of interventions varied considerably across studies; with two of the eight studies presenting two four-minute videos[1,2], two studies consisted of a total of 3-hours of the intervention[3,5] and one study consisted of a single 4-hour session on mental health first aid for EDs[8]. Two studies undertook a week-long series of awareness programmes and events including a poster campaign[4,6] and one study was made up of eight 45-minute sessions over a four-week period[7].

Interventions were delivered in a variety of formats and often by the researcher evaluating the outcomes. Two studies were delivered to students online via video presentation[1,2], and two interventions were delivered through health promotion events by a series of presenters[4,6]. The remaining were delivered by a range of professionals including psychologists[3], trained facilitators[8] and the primary researchers[5,7].

3.5 Measures of mental health literacy

A variety of measures were used to assess MHL outcomes. Some studies reported on the reliability and validity of measures and some were not standardised. They are as follows:

Six of the eight studies investigated stigmatising attitudes[1,2,3,5,6,8]. Four of those studies utilised the Social Distance Scale (Link, Cullen, Frank & Wozniak, 1987) to measure stigmatising attitudes[1,2,3,8]. The Social Distance Scale is typically used to measure traditional stigma which refers to labelling of individuals with mental health problems as undesirable and holding negative beliefs and attitudes towards them (Goffman, 2009; Hinshaw &Stier, 2008). Two of these four studies also used the Positive Volitional Stigma (PVS) Scale and Negative Volitional Stigma (NVS) Scales (Mond and Arrighi, 2012; Mond et al., 2006)[1,2]. PVS and NVS are thought to be relevant to the study of AN (Easter, 2012). For some people AN is not considered a real psychiatric condition but rather a personal choice (Darby et al., 2012). Therefore, focusing on traditional stigma may overlook this view of AN. Thus, perceptions where AN is trivialised as a personal choice are referred to as volitional stigma (Easter, 2012). Volitional stigma can be viewed as positive or negative with PVS referring to when an individual's behaviour is perceived as positive (i.e. admirable) and NVS refers to when their behaviour is perceived as negative (i.e. a character flaw)[1,2]. One of the six studies utilised the Opinions Scale (Stewart et al., 2006) and the Eating Disorder Stigma Scale (EDSS) (Crisafulli et al., 2010)[5] and the final study measured stigma using an adapted Questionnaire of Stigmatisation of Eating Disorders (Crisafulli et al, 2008; Crisp et al., 2000; Stewart et al., 2006)[6].

Four studies[1,2,3,8] utilised vignettes to measure recognition of eating disorders (Griffiths et al., 2015). The Mental Health Literacy Questionnaire for Bulimic Type Eating Disorders (MHLQ-B; Mond et al., 2004) was utilised in two studies[3,8]. In addition, one other study assessed help-seeking behaviour for self and friend using the Eating

Disorder Help-Seeking Behaviours Inventory: Friend Version and the Eating Disorder Help-Seeking Behaviours Inventory: Self Version modified versions of the Attitudes Towards seeking Professional Psychological Help Scale (ATP-SF; Fischer & Farina, 1995)[4].

Two studies used The First Aid Knowledge Test scale (FAKT; Orygen Youth Health Research centre, 2008)[3,8]. Two studies assessed eating disorder knowledge, one using The Knowledge of Eating Disorder Symptoms (Orygen Youth Health Research centre, 2008), a single item question unvalidated questionnaire was used in one study[8] and the other the Eating Disorder Knowledge Questionnaire (Turk, Prentice, Chappell, & Shields, 1999)[7]. One study examined participants' beliefs about the causes of eating disorders using an adapted 4-item questionnaire (Crisfulli et al., 2008; Stewart et al., 2006)[6].

3.6 Study outcomes

A brief overview of the results is presented in Table 4. This outlines changes in students' stigmatising attitudes, help-seeking intentions/knowledge, ED recognition, and other ED knowledge including aetiology, risk factors and treatment following ED-MHL interventions.

Table 4.

Brief overview of training outcomes

Author	Stigmatising Attitudes	Help-seeking	ED Recognition	ED knowledge		
				Aetiology	Risk Factors	Treatment
Sebastian, Richards & Bilgin (2017)	~ ↑	-	-	-	-	-
Sebastian & Richards (2017)	~ ↑	-	↑	-	-	-
Gratwick-Sarli & Bentley (2014)	↑	-	↑	-	-	↑
Tillman, Sell, Yates & Mueller (2015)	-	~ ↑	-	-	-	-
Bannatyne & Stapleton (2015)	~ ↑	-	-	-	-	-
Duffy & Henkel (2016)	ns	-	-	~ ↑	-	-
Torres-McGehee, et al., (2011)	-	-	-	↑	↑	~ ↑
Hart, Jorm, & Paxton (2012)	ns	↑	↑	↑	-	↑

Note: ↑ = improvement following intervention; - = not measured; ns = no changes found; ↓ = decrease following intervention; ~ ↑ = mixed results; $_a$ = data not reported as missing. For controlled and randomised controlled trials, the overview is in respect to the comparison group.

Table 5.

Description of characteristics and results of included studies

Authors/ Year/ Country Study number	Design	Participants Population *n* Mean or Median age/range Gender	Intervention/ Duration	Measures	Key results
1. Sebastian, Richards, and Bilgin (2017) Australia	Randomised three-way mixed experimental design Convenience sampling	Undergraduate Psychology students *n* = 122 19.66yrs (18-32) 50.8% females	To examine whether two video interventions, one with a service-user (video contact) and one with an expert in the field (video lecture) can improve stigmatising attitudes to AN. Participants were shown these two four-minute videos sequentially. Three types of stigma were assessed, traditional, positive volitional stigma and negative volitional stigma.	*Pre, post intervention 1, post intervention 2* The Social Distance Scale Positive Volitional Stigma (PVS) Negative Volitional Stigma (NVS)	***Significant differences were found when comparing the contact video versus the lecture video intervention. Specifically:*** ***Positive Volitional Stigma:*** For PVS a significant reduction in stigma was found post intervention for video contact compared to video lecture intervention. This was significant for male ($F(1,60) = 30.260$, $p <.001$) and female participants ($F(1,58) = 35.213$, $p <.001$). For PVS there was a significant cumulative effect of receiving two interventions delivered sequentially compared to only receiving a single intervention. This effect was found only when video lecture was followed by video contact intervention. This was significant for male ($F(1,60) = 4.743$, $p =.033$) and female participants ($F(1,58) = 8.838$, $p = .004$). ***Negative Volitional Stigma:*** For NVS a significant reduction in stigma was found post intervention for both video and contact interventions

					(F(1.92,227)=95.336, p < .001). However, the intervention did not differentially affect the outcome (F(1.92, 227) = 0.896, p = .406). For NVS there was a significant cumulative effect of receiving two interventions delivered sequentially (video contact followed by video lecture and vice versa) compared to only receiving a single intervention (F(1,118) =14.115, p < .001). ***No significant differences found in following:*** Traditional stigma scores did not significantly differ from baseline to post-intervention for the contact video or video lecture intervention (F(1.488, 175.598) =1.074, p =.328).
2. Sebastian and Richards (2017) Australia	Randomised four-way mixed experimental design Convenience sampling No controlled comparison was provided	Undergraduate Psychology students n = 245 19.6yrs (18-32) 51% males	To compare the use of an Avatar with a video to deliver two interventions (education and contact) to reduce stigmatising attitudes towards AN. Participants in the Avatar group interacted with an Avatar depicting a service-user with AN (contact) followed by another Avatar depicting an expert in the field of AN (lecture). Participants in the video group were shown two four-	*Pre, post intervention 1, post intervention 2* Recognition of AN (vignette) The Social Distance Scale Positive Volitional Stigma (PVS) Negative Volitional Stigma (NVS)	***Significant differences found in recognition across time for mode of presentation (static vs interactive), presenter (live person vs avatar) and intervention (contact and/or lecture)*** ***Significant differences found in recognition across time for all four interventions:*** A significant improvement in recognition of AN was found post intervention across all four interventions (video contact, video lecture, ECA contact and ECA lecture) (χ²(2) = 141.7, p < 0.001). A significant improvement in participants' ability to differentiate AN from other forms of ED was found post intervention across all four interventions (χ²(2) = 26.53, p < 0.001). A significant reduction in participants incorrect reporting of AN as another form of psychiatric difficulty was found post intervention across all four interventions (χ²(2) = 57.8, p < 0.001). A significant increase in participants incorrectly identifying AN in the BN vignettes was found over time (χ²(2) = 135.2,

			minute videos. One with a service-user (video contact) and one with an expert in the field (video lecture).		$p < 0.001$). There was a significant cumulative effect of receiving two interventions delivered sequentially compared to receiving only a single intervention ($\chi^2(2) = 13.8$, $p < 0.001$). Recognition in general was not further improved by the delivery of a second intervention; there were no significant cumulative effect of receiving two interventions consecutively compared to receiving only a single intervention. This was the case for recognition of AN ($p > 0.05$), participants ability to differentiate AN from other forms of ED ($p > 0.05$), and participants incorrect reporting of AN as another form of psychiatric difficulty. ***Positive Volitional Stigma***: For PVS overall the interventions were effective in reducing stigma post intervention ($F(1.84,444.1) = 108.73$, $p < 0.001$) and there was a cumulative effect of receiving two interventions consecutively compared to receiving only a single intervention ($F(1,241) = 15.77$, $p < 0.001$). ***Negative Volitional Stigma:*** For NVS overall the interventions were effective in reducing stigma post intervention ($F(1,241) = 137.54$, $p < 0.001$) and there was a cumulative effect of receiving two interventions consecutively compared to receiving only a single intervention ($F(1,241) = 191.54$, $p < 0.001$). ***Traditional Stigma:*** Traditional stigma scores did not significantly differ from baseline to post-intervention between interventions ($p > 0.05$) and no cumulative effect was found ($p > .05$) ***Type of media presentation:*** No effect was found between the two interventions for the type of media presentation (interactive or static). This held across all types of stigma (PVS/NVS and traditional stigma). This was consistent pre to post intervention and at follow-up) with all significance levels at $p > 0.05$.

3. Gratwick-Sarli and Bentley (2014)\n\nAustralia	Uncontrolled repeated measures design	Undergraduate Psychology students\n\n*n* = 177 *(pre)*\n*n* = 162 *(follow up)*\n\nAged 18-46yrs (M = 20.3)	An early intervention programme 'Should I Say Something?' aimed at improving ED-MHL.\n\nA 3-hour-single session workshop presented in class providing information about how to assist someone developing or experiencing an ED. It includes PowerPoint presentations, group discussions, and small group activities.	*Pre, post, 3-month follow-up*\n\nFAKT\n\nMHLQ-B\nRecognition of BN (vignette)\n Knowledge of effective treatments/interventions\n Attitudes\n\nThe Social Distance Scale	***Significant differences found in the following:***\n\n***FAKT:***\nParticipants' knowledge of best practice first aid strategies (FAKT) significantly improved at post intervention (F(1.80, 290.56) = 449.94, p < .001)[a] and was maintained at follow-up (*p* < .001)\n\n***Recognition:***\nThere was a sustained significant improvement in participants recognition of BN from baseline to follow-up (χ^2(2,163) = 32.96, *p* < .001).\n\nParticipants ability to recognise bulimic-type EDs significantly improved at post-intervention (χ^2(2,164) = 31.57, *p* < .001) and was maintained at follow-up (*p* < .001)\n\nParticipants were significantly less likely to choose a non-ED problem at post-intervention (χ^2(2,163) = 36.81, p <.01) and this was maintained at follow-up (*p* < .01)\n\n***Social Distance Scale:***\nFor social distance there was a significant reduction in stigmatising attitudes towards individuals with EDs at post-intervention (F(1.85, 287.45) = 5.13, *p* < .01) and this was maintained at follow-up (t(157) = 2.75, *p* < .01).
4. Tillman, Sell, Yates, and Mueller (2015)\n\nUSA	Pre/post longitudinal design	Undergraduate students\n\n*n* = 136\n\n84% female	A campus-wide week-long psychoeducational and awareness programme designed to improve student's awareness about body image and eating disorders.	*Pre, post intervention*\n\nEating Disorder Help-Seeking Behaviours Inventory: Friend Version\n\nEating Disorder Help-Seeking Behaviours Inventory: Self Version	***Significant differences found in the following from pre to post intervention:***\n\n***Analyses for students with low eating concerns (n = 117; 86%)***\nParticipants with low eating concerns reported significantly higher help-seeking intentions for a friend experiencing an ED post intervention (t(135) = 4.67, *p* < .05, d =.34).

| | | | Information related to EDs was provided through campus fairs, talks by ED specialists, handouts, documentary films, plays and poetry readings. | | Participants with low eating concerns reported significantly higher scores on seeking help for themselves if they were experiencing an ED post intervention (t(135) = 9.82, *p* < .05, d = .63).

No significant differences found in the following from pre to post intervention:

Analyses for students with high eating concerns (n = 19; 14%)
Participants with high eating concerns help-seeking intentions for a friend experiencing an ED did not significantly improve (t(18)= -.76, *p* > .05, d = .01).

Findings for personal help-seeking intentions were not reported. |
| 5. Bannatyne and Stapleton (2015)

Australia | RCT | Fourth year Medical students

n = 40

25.33yrs (20-55)

60% males | To compare the effectiveness of two educational programmes (biogenetic education vs multifactorial education programme) in reducing stigmatising attitudes towards individuals with AN.

The intervention was delivered for three hours over a week period. Information included factors related to aetiology, management, early identification and treatment of AN. | *Pre, post, 8-week follow-up*

Eating Disorder Stigma Scale (EDSS)

Opinions Scale | ***Significant differences found in the following:***

Total EDSS:
For the EDSS a significant reduction in ED stigma scores was found at follow-up for the biogenetic (*p* = < .001) and the multifactorial (*p* = .001) groups compared to the control group. No significant differences in ED stigma scores were found between groups at post intervention or follow-up (*p* = .180).

EDSS blame sub-scale:
For the blame item on the EDSS a significant reduction in blame towards AN was found at follow-up for the biogenetic (*p* = < .001) and multifactorial (*p* = .003) groups compared to the control group. No significant differences were found between the biogenetic and multifactorial groups at post intervention or at follow-up (*p* = .595). Both groups found significant reductions in blame at post intervention with this reduction was maintained at follow-up

EDSS selfish/vain sub-scale: |

					For the selfish/vain item on the EDSS a significant reduction in viewing individuals with AN as selfish and vain was found at follow-up for both the biogenetic ($p < .001$) and multifactorial ($p = .001$) groups compared to the control group. The multifactorial group showed significantly lower selfish/vain scores compared to the biogenetic group at post intervention. No significant differences were found in selfish/vain scores between groups at follow-up ($p = .181$). ***Opinions Scale*** ***Responsibility sub-scale:*** For the responsibility subscale a significant reduction in perception of illness responsibility was found for the biogenetic ($p < .001$) and multifactorial ($p = .004$) groups compared to control group. No significant differences were found between groups at post intervention or at follow-up ($p = .172$).
6. Duffy and Henkel (2016) USA	Pre-post longitudinal design	Undergraduate Nursing students *n* = 131 *(pre-test)* *n* = 79 *(post- test)* Median = 21yrs (19-42) 100% females	To examine the effects of week-long ED poster campaign on nursing student's attitudes about individuals with EDs.	*Pre, post intervention* An adapted 4-item Questionnaire of Stigmatisation of EDs. An adapted 4-item Questionnaire measuring beliefs about causes of EDs.	***No significant differences found in the following from pre to post intervention:*** ***Questionnaire of stigmatisation:*** Following exposure to a week-long awareness programme no significant differences were found in participants stigmatising attitudes towards people with EDs at post intervention ($F(4,199) = 0.782$, $p = .538$). ***Knowing someone with an ED:*** Participants knowing or not knowing someone with an ED did not differentially effect stigmatising attitudes towards people with EDs at post intervention ($F(4,199) = 0.759$, $p = .553$). ***Questionnaire about causes of EDs:*** A significant difference in participants' beliefs about the causes of EDs was found at post intervention ($F(4,200) = 3.447$, $p = .009$). No significant interaction effect was found between pre and post intervention and knowing someone with an ED on beliefs about the causes of EDs ($F(4,200)=1.528$, $p = .195$).

7. Torres-McGehee, Green, Leaver-Dunn, Leeper, Bishop and Richardson (2011) USA	Pre, post Convenience sample	University auxiliary dancers n = 40 18-25yrs 100% female	To investigate the efficacy of a team based educational programme to prevent eating disordered behaviours in collegiate dancers. Eight lessons were delivered for 45mins over a 4-week period. The educational programme contents included information about sports nutrition, exercise, and disordered eating consequences.	*Pre, post intervention* Eating Disorder Knowledge Questionnaire	***Significant differences found in the following from pre to post intervention:*** A significant increase in participants' ED knowledge (F^b= 18.90, p = .01). A significant increase in participants' knowledge of the causes of EDs ((F= 8.30, p = .02). A significant improvement in participants' ability to recognise the signs and symptoms of EDs (F= 6.40, p = .03). A significant improvement in participants' ability to identify risk factors for developing an ED (F=9.30, p = .01). ***No significant differences found in the following from pre to post intervention:*** No improvement in participants' knowledge of management and treatment for EDs (F= 0.02, p = .89).
8. Hart, Jorm and Paxton (2012) Australia	Uncontrolled repeated measures design Convenience sample	Undergraduate students and staff n = 53 (students) n = 20 (staff)[a] 23.84yrs (17-62) 90% female	Training intervention on MHFA for EDs to improve knowledge, attitudes and behaviour towards people with EDs. 4-hour single session, face to face education programme (teaching through PowerPoint presentations, small group learning activities and whole group discussions).	*Pre, post, 6-month follow-up* Knowledge of Eating Disorder Symptoms MHLQ-B Problem recognition BN (vignette) Knowledge of effective treatments/interventions FAKT The Social Distance Scale	***Significant differences found in the following:[c]*** ***Pre to post intervention results compared to control:*** A significant increase in the specific recognition of BN (p = <.001) post intervention, non-significant at follow-up (p = .115). A significant increase in participants' recognition of the problem in the vignette as an ED in general terms (p = <.001) post intervention and follow-up (p = .007). A significant decrease in participants' recognition of the problem in the vignette as any general mental health problem (p = < .001) post intervention and this was maintained at follow-up (p = .002).

					Participants demonstrated significantly greater knowledge of effective treatments ($p < .001$) post intervention and this was maintained at follow-up ($p < .001$).
					Participants demonstrated significantly greater knowledge of informal help-seeking ($p = .004$), post intervention but this was non-significant at follow-up ($p = .054$).
					A significant increase in participants' knowledge of best practice first aid strategies ($p < .001$) at post intervention and this was maintained at follow-up ($p < .001$).
					No significant differences found across time:
					For participants attitudes towards individuals with EDs (no *p* value reported).

[a] Assumption of sphericity was violated so the Huynh-Feldt estimate of sphericity was used.

[b] Degrees of freedom for ANCOVA were not reported.

[c] Staff included in this paper please see pg. 36 for full discussion and reason for inclusion.

3.7 Effectiveness of interventions

The overall findings for the effectiveness of ED-MHL interventions showed that all eight studies demonstrated a significant improvement in at least one area of participants' MHL following intervention. These findings will be discussed specifically in relation to the 4 aspects of MHL; stigmatising attitudes, help-seeking intentions/knowledge, ED recognition and other ED knowledge including aetiology, risk factors and treatment. More weight will be given to the findings that were from methodologically robust studies with higher quality ratings.

3.7.1 Improvements in stigmatised attitudes

MHL interventions aiming to improve stigmatised attitudes were effective. Four of the six studies assessing stigmatising attitudes towards individuals with EDs showed a significant decrease in participants' scores on at least one stigma measure following the interventions either compared to a control group or pre intervention scores[1,2,3,5]. However, some studies used multiple stigma measures and found mixed results, these are discussed and summarised below. Two studies showed no reduction in stigma over time[6,8]. However, one[8] of these studies was one of the more methodologically robust studies so the findings must be considered carefully, whilst the other study[5] was of lower quality rating.

Sebastian, Richards and Bilgin's (2017) study was one of the most methodologically robust findings based on the quality assessment ratings. They found a significant

difference in Positive Volitional Stigma (PVS) between intervention type (contact video and lecture video) from baseline to post intervention. Their study shows that the video illustrating contact with a person with an ED produced greater reductions in PVS compared to a video lecture. A cumulative effect (with further reduction in PVS) was found when participants received two interventions sequentially, compared to receiving only one intervention, this effect was found only when lecture video was followed by contact video, the findings held for both men ($p < .001$) and women ($p < .001$). Negative Volitional Stigma (NVS) significantly reduced across all time points following each intervention (all $p < .001$). However, there was no significant differences between contact video and lecture video for NVS ($p = .406$). Again, for NVS there was a cumulative effect of both interventions being provided sequentially compared to receiving only one intervention.

Sebastian and Richards (2017) results were similar to Sebastian, Richards and Bilgin (2017) and their quality rating was equally methodologically robust. They found that for PVS and NVS all interventions (mode of presentation (static vs interactive) and delivery of intervention (contact vs lecture)) produced a significant reduction in stigma at post intervention ($p < 0.001$). Like Sebastian, Richards and Bilgin (2017) there was a cumulative effect of two interventions being received sequentially compared to receiving one intervention. This was consistent for both NVS and PVS ($p < 0.001$).

However, no differences were found between groups at post intervention for Traditional stigma in either study (Sebastian, Richards and Bilgin (2017) and Sebastian and Richards (2017)). Whilst both studies were rated as medium quality neither study utilised a controlled comparison group therefore limiting the authors

ability to conclude that the changes in stigmatised attitudes were attributable to the ED-MHL interventions. Other extraneous variables uncontrolled for could account for this improvement. Thus, whilst positive findings these results should be taken with caution.

Whilst the quality assessment rating for Bannatyne and Stapleton's (2015) study was lower than those discussed above, the study was an RCT and therefore deemed methodologically more robust than others with a low-quality rating. Bannatyne and Stapleton (2015) conducted an RCT comparing the effectiveness of two educational programmes on stigmatising attitudes. They found results which were consistent with the above studies. Both intervention groups (biogenetic education vs multifactorial education) showed a significant reduction in stigma compared to the control group on the Eating Disorder Stigma Scale (EDSS) ($p = < .001$; $p = .001$). The EDSS was subsequently broken into the individual subscale items of which only two significant items were reported (blame and selfish/vain). This showed reductions on the blame item of the EDSS for both biogenetic education ($p = < .001$) and multifactorial education ($p = .003$) groups at post intervention compared to the control group. However, no differences between groups scores were found at follow-up ($p = .595$).

Similarly, on the selfish/vain subscale of the EDSS significant differences were found between the biogenetic ($p < .001$) and multifactorial ($p = .001$) groups compared to the control group at follow-up. But differences were not observed at follow-up between groups on this subscale item ($p = .181$). In a similar vein, when reporting the findings from the Opinions scale, the authors only reported one subscale item (responsibility) of the 5 items which comprise the measure. Which reported a significant reduction in

perception of illness responsibility for the biogenetic ($p < .001$) and multifactorial ($p =$ .004) groups compared to the control group. No significant differences were found between groups at post intervention or at follow-up ($p = .172$). Three of these sub scale items were omitted from the findings and the final one sub scale item was presented in a table. Analysis of these tables can be considered ambiguous and therefore some findings have had to be omitted from the review.

Duffy & Henkel's (2016) study was inconsistent with the above studies, however overall its quality rating was found to be low and some bias in reporting was evident, so less weight should be placed on its conclusions. No significant effect from pre to post intervention on participants' beliefs and attitudes about people with EDs ($p = .553$) was found. Similarly, whether participants did or did not know someone with an ED did not significantly affect participants' attitudes towards people with EDs (p = .553).

Four studies above found a significant reduction in stigmatising attitudes with at least one of their stigma measures following their ED-MHL intervention. The Sebastian (2017) studies utilised different scales to Bannatynne and Stapleton (2015) to investigate stigmatising attitudes; the PVS, NVS, Social Stigma Scale, EDSS and the Opinions Scale were used respectively. Both the Sebastian studies (2017) and Bannatynne and Stapleton (2015) used at least one measure with established validity and reliability (The Social Distance Scale and the EDSS respectively). Whereas the NVS and PVS utilised by Sebastian et al., (2017) have not been validated beyond factor analysis and internal consistency measurement (Mond et al., 2006; Sebastian, Richards & Bilgin, 2017; Sebastian & Richards, 2017;).

Furthermore, Bannatynne and Stapleton (2015) used the Opinions scale where the internal consistencies of only two items of the 5-item scale have been assessed in previous research; .68 for fear and exclusion subscale items and .86 for responsibility subscale items on the Opinions scale (e.g. Bannatyne & Abel, 2014). This is in contrast to the Sebastian studies (2017) which reported total scale scores and more thoroughly investigated stigmatising attitudes. Bannatynne and Stapleton (2015) show a bias in the preferential reporting of only significant findings in relation to the Opinions scale and lack of clarity in other results presented in the tables. Whilst both studies are more methodologically robust in comparison to other studies reviewed, the lack of standardised measures used makes it hard to ascertain whether the measures actually reflect the constructs being investigated, or if they are appropriate to the population and satisfy its purposes (Wei et al., 2016).

3.7.2 Improvements in help-seeking intentions/knowledge

The two studies[4,8] that assessed MHL interventions to improve help-seeking intentions/knowledge found mixed results. Hart, et al., (2012) was the most robust study with strong methodological quality ratings. It demonstrated improved knowledge of help-seeking from pre to post intervention (p = .004) although this effect was not maintained at follow-up (p = .054). Tillman et al., (2015) reported mixed findings, showing that students with low eating concerns demonstrated improved help-seeking intentions from pre to post intervention for a friend suffering with an ED (t(135) = 4.67, p<.05 d =.34), and improved help-seeking intentions for themselves if they suffered with an ED (t(135) = 9.82, p < .05, d =.63). However, students with high eating concerns did not show a significant improvement in help-seeking intentions over time

for a friend ($p > .05$), and the results for help-seeking intentions for self were not reported.

It should be noted that studies in the literature vary in the help-seeking measures employed; some assessing help-seeking intentions and others help-seeking knowledge. Research has demonstrated that help-seeking intentions are more strongly associated with actual help-seeking behaviour than between help-seeking attitudes and behaviour (Ajzen, 1991, 2002; Fishbein & Ajzen, 1975; Kim & Hunter, 1993). The measures utilised in the current systematic review assessed both knowledge and intentions, however its association with actual help-seeking behaviour was not measured.

3.7.2 Improvements in recognition

Overall MHL interventions to improve recognition of EDs were effective. Four studies assessed recognition, three of which utilised vignettes depicting either a young person with BN[3,8] or AN[2] and the fourth study assessed recognition of EDs generally[7]. All studies found that recognition improved following their respective interventions[2,3,7,8].

Hart et al., (2012) showed that participants demonstrated greater recognition of BN from pre to post-intervention ($p = < .001$), although this was not maintained at follow-up ($p = .115$). Participants also demonstrated a significant decrease in recognition that the symptoms related to a general mental health problem at post intervention ($p = <.001$) and follow-up ($p = .002$) compared to pre intervention scores. In addition,

participants also showed greater recognition of the problem as an ED in general terms at post testing (p = .001) and follow-up (p = .007) compared to pre intervention scores.

Sebastian and Richard's (2017) results were consistent with Hart et al., (2012) showing that participants improved in their recognition of AN at post intervention (p < .001), and similarly found a number of additional significant findings related to recognition. This is summarised in Table 5. Additionally, Torres-McGehee et al., (2011) found participants' recognition of the signs and symptoms of EDs improved significantly post intervention compared to the control group. All three studies were methodologically robust in comparison to other studies in the review. Gratwick-Sarli & Bentley, (2014) while having a lower quality rating, also demonstrated a significant improvement in the recognition of BN across time (p < .001). Participants again significantly improved in their identification of bulimic-type eating disorders across all time points (p < .001) and were less likely to choose a non-ED problem across time (p < .01).

3.7.4 Improvements in ED knowledge

Different aspects of ED knowledge were evaluated including treatment, aetiology and risk factors. They're discussed in turn:

3.7.4.1   Knowledge of eating disorder treatments

Three studies assessed different aspects of knowledge of ED treatments, with all three showing a significant improvement in participants' knowledge following the MHL

intervention[3,7,8] on at least one of their outcome measures when compared to a control group or pre intervention scores. Hart et al., (2012) found improved knowledge of effective treatments for EDs across all time points ($p < .001$) using the MHLQ-B. However, an equally robust study by Torres-McGehee et al., (2011) found no improvement in participants' knowledge of symptom management and treatment of EDs. They did however find a significant improvement in participants' ED knowledge overall post intervention compared to the control group.

Similarly, Hart et al., (2012) found improvements in participants' knowledge of best practice first aid strategies (FAKT) across time ($p < .001$). Whilst not as methodologically robust a study (2012) Gratwick-Sarli and Bentley's (2014) results were consistent with Hart et al's., (2012) study showing a significant difference over time for scores on the FAKT, demonstrating greater knowledge of best practice first aid strategies. However, significantly, the FAKT has not been validated and results could be due to re-test effects. There was also a lack of a control comparison group which limits the conclusions drawn about the improvements made for both studies (Gratwick-Sarli & Bentley, 2014; Hart et al., 2012).

3.7.4.2　Aetiology

Two studies[6,7,] investigated participants' beliefs about the causes of EDs, with both showing a significant improvement in their knowledge of the causes of EDs following the MHL intervention. Torres-McGehee et al., (2011) found participants' knowledge of the causes of EDs improved significantly post intervention compared to the control group. Although having received a low-quality rating Duffy and Henkel (2016) found

results consistent with the above, showing a significant improvement in participants' beliefs about the causes of EDs post intervention. However, knowing or not knowing someone with an ED did not differentially effect participants' beliefs about the causes of EDs from pre to post intervention.

This study was one of the low-quality studies meeting only four of the nine criteria. It lacked a control group, and there was high attrition from pre to post testing which limits generalisability of results. The authors also noted that the sample consisted of only nursing students and thus the results may not be generalisable to all medical professionals. Finally, the reliability of the outcome measures was unknown (Duffy & Henkel, 2016).

3.7.4.3   Risk factors

Torres-McGehee et al., (2011) found a significant improvement in participants' ability to identify risk factors for developing an ED compared to the control group. Despite finding positive results, the primary criticism of the study concerned the psychometric properties of the eating disorder knowledge questionnaire, as it hasn't been validated and therefore, we cannot conclude that the results obtained are a true reflection of the intervention. In addition, participants weren't randomly allocated to conditions, which can increase bias and could explain the significant difference found in demographic details between groups at baseline.

1. Discussion

This systematic review provided a comprehensive synthesis of empirical research examining the effectiveness of MHL interventions for students at risk of developing EDs. The review summarised the study characteristics and results of eight empirical studies. Overall, all eight studies showed ED-MHL interventions were successful in improving at least one component of MHL. The key results relating to stigmatising attitudes, help-seeking intentions/knowledge, ED recognition and ED knowledge regarding aetiology, risk factors and treatment are discussed in turn.

4.1 Stigmatising attitudes

Following the ED-MHL interventions, stigma towards individuals with EDs reduced across studies. However, some results were mixed, and controlled comparisons were not always offered limiting the authors ability to conclude that the changes seen were a result of the ED-MHL interventions utilised. This finding is consistent with Brownlow et al., (2015) which found that health professionals stigmatising attitudes towards EDs reduced following an online intervention. It should be noted however, that other studies included in the review have been contradictory showing no reduction in ED stigma over time (Hart et al., 2012; Duffy & Henkel, 2016). But confidence in their conclusions is reduced given the studies' methodological limitations (e.g. no controlled comparison groups and small sample sizes). However, the findings from this study were consistent with the majority of literature showing that community samples of women, as well as symptomatic individuals, had higher levels of stigmatising attitudes (Mond et al., 2004; Mond et al., 2008).

As mentioned above, overall stigma was found to reduce following the ED-MHL interventions with some studies showing mixed findings. However, these mixed findings were predominantly due to the authors of these studies investigating the construct of stigma more closely. In addition to determining whether their interventions were effective at reducing stigma, they hypothesised whether their intervention would be more effective at reducing certain types of stigma (i.e. PVS, NVS vs traditional stigma). As such, these studies have gone a step further and investigated the construct of stigma in more detail, attempting to determine what the key ingredients in interventions might be in effectively reducing different types of stigmatising attitudes.

4.2 Help-seeking behaviours

There were limited studies investigating ED help-seeking intentions and knowledge. However, there were some promising results in relation to help-seeking knowledge from a good quality study. Hart et al., (2012) found significant improvements in participants' knowledge of help-seeking at post intervention, but the effect was not maintained at follow-up. Another study provided mixed findings, although given its methodological limitations we would be less confident in their conclusions (Tillman et al., 2015).

Significantly, neither of the two studies used validated measures to evaluate help-seeking knowledge or intentions. Tillman et al., (2015) utilised a modified version of the Attitudes Toward Seeking Professional Psychology Help Scale - Short Form (ATP-SF; Fischer & Farina, 1995) and Hart et al's., (2012) measure was designed

specifically for use in that study. The lack of validation in both measures means caution is recommended as it is unclear whether the measures reflect the true constructs being investigated.

Despite the awareness of the importance of individuals accessing treatment for their EDs there are very few studies evaluating help-seeking behaviour. Furthermore, evidence shows that stigma is a major barrier to treatment uptake (Hepworth & Paxton, 2007), with no studies having investigated this relationship between stigma and help-seeking behaviour. Whilst studies utilise a number of help-seeking measures research suggests that evaluating help-seeking intentions as opposed to knowledge or attitudes is more beneficial, given that a stronger correlation has been found with actual help-seeking behaviour (Kim & Hunter, 1993). These findings suggest the need for future research to conduct more methodologically robust studies utilising controlled comparison groups and standardised measures assessing help-seeking intentions.

4.3 Eating disorder recognition

ED recognition improved following the ED-MHL interventions across studies, with most studies having medium quality ratings, however controlled comparisons weren't always included. In addition, two studies showed sustained improvements in BN recognition at follow-up, but the remaining two studies only assessed at post-intervention. Nevertheless, these are promising findings and in contrast to previous literature which conveyed that women at low risk, high risk and symptomatic individuals showed poor recognition of BN (Mond et al., 2010a). The same can be said of a community sample of women (Mond et al., 2004), and a population study showing

that women with high BN symptoms had poor recognition of BN (Mond et al., 2008). These studies taken together suggest that both the population and individuals with EDs have poor recognition of EDs. Thus, suggesting the need for more community targeted ED-MHL interventions rather than just student samples.

The use of vignettes to assess ED recognition has been utilised extensively within the MHL literature with children and university students (Jorm, Wright & Morgan, 2007; Hart et al., 2016; Reavely & Jorm 2011). The vignettes have been reviewed by several clinical psychologists and piloted on a sample of trainee Clinical Psychologists, to ensure face and content validity (Loades and Mastroyannopolou, 2010). However, their reliability, construct and predictive validity and sensitivity to change have not been measured. Furthermore, each study has tailored the follow-up questions to be in line with their intervention and audience, therefore reducing the consistency amongst studies and making clear comparisons difficult to make. Future research would benefit from developing and utilising a consistent approach with the follow-up questions and a similar scoring system to reduce heterogeneity amongst studies.

It has also been shown that improved recognition can result in individuals accessing early treatment and receiving the much-needed support (Mond et al., 2010). In conclusion, the findings of the systematic review in relation to ED recognition suggest the continued need to conduct methodologically robust studies, with large sample sizes, controlled comparison groups and follow-up periods in order to determine whether effects are maintained following the interventions.

4.4 Eating disorder knowledge

Overall the findings suggest a complex pattern of results regarding ED knowledge, as most studies defined and measured knowledge differently. This makes it hard to draw overall conclusions regarding improvements in ED knowledge.

4.4.1 Knowledge of eating disorder treatments

It should be noted, however, that following the ED-MHL interventions, knowledge of ED treatment appeared to improve across studies, yet the results were mixed, and limited by a lack of controlled comparison groups and use of a variety of unstandardized measures.

For example, one study evaluated knowledge of effective treatments for EDs using the MHLQ-B (Hart et al., 2012), and another study evaluated symptom management and treatment of EDs with the ED knowledge questionnaire, an unvalidated measure (Torres-McGehee et al., 2011). The remaining two studies utilised the FAKT, and both showed improvements in participants' knowledge of best practice first aid strategies following the ED-MHL interventions. However, as with the above studies, the FAKT has not been validated and results could be due to re-test effects (Hart et al. 2012). Moreover, there was a lack of a control comparison group limiting the conclusions drawn about the improvements made for both studies (Gratwick-Sarli & Bentley, 2014; Hart et al., 2012). The results are in contrast with the literature portraying that participants' knowledge of ED treatments did not improve, instead they endorsed the

use of self-help strategies, vitamins and minerals, and were ambivalent about anti-depressant use (Bacaltchuk & Stefano, 2004; Mond, Mark, Hay et al., 2007).

4.4.2 Aetiology

Few studies investigated participants' beliefs about the causes of EDs. Yet for those that did, the results were promising, with one medium quality study showing improvements in participants'' beliefs about the aetiology of EDs compared to a control group (Torres-McGehee et al., 2011). The other study found partially consistent results with the above study; however, it received a low-quality rating, had no controlled comparison group, experienced high attrition from pre to post intervention, and the reliability and validity of the outcome measures were unknown (Duffy & Henkel, 2016).

4.4.3 Risk factors

There were a lack of studies investigating participants' ability to identify risk factors for developing an ED. Promisingly, one study found significant improvements in participants' ability to identify risk factors for developing an ED following the ED-MHL intervention (Torres-McGehee et al., 2011). Unfortunately, no other studies were found in the research literature to draw comparisons with it. The study was limited by the lack of a psychometrically validated scale and baseline differences between groups was found likely because participants weren't randomly allocated to conditions, and therefore increasing the risk of bias.

Overall the findings relating to ED knowledge suggest that studies were methodological limited in a number of areas. In particular aetiology and risk factors were underrepresented in the literature with only three studies in total investigating those areas, and not many more studies investigating knowledge of ED treatment. More research is needed in this area to be able to draw accurate conclusions about the findings.

4.5 Limitations

A thorough review was conducted however, unpublished and grey literature research was not included, and as a result publication bias may have been present. Furthermore, all studies were conducted in the United States of America or Australia, minimising generalisability. Another limitation was that all studies were included regardless of their quality ratings due to the limited number of studies available and a meta-analysis was not possible given the heterogeneity in intervention, design and outcome measures between studies. Despite these limitations, improvements in ED-MHL of students was found across all studies on at least one measure of MHL.

Only two studies (Hart et al., 2012; Torres-McGehee et al., 2011) reported having calculated the required power needed to determine an effect with one of the studies (Hart et al., 2012) reporting that their study lacked the power to uncover a statistically significant effect due to the small sample size. Without consideration of statistical power, it is possible that an effect may have been missed (Norton & Strube, 2001). Future research would benefit from including power analyses. Studies might also consider conducting post hoc power calculations when statistically insignificant

findings are found particularly where clinically important trends are found (Dorey, 2010).

As evidenced by the current review, the ED-MHL research in the student population is in its infancy. It is hoped that further evidence-based research will be conducted in university samples in order to gain an understanding of what the effective ingredients in ED-MHL interventions are. It would be helpful to determine whether particular professionals are better at delivering the interventions (e.g. teachers, psychologists etc.), what the optimum delivery format might be (e.g. face to face or online) and what the ideal length and number of sessions (e.g. 2 sessions, 6 sessions or a week long campaign) might be in showing long term improvements in students' ED-MHL. This would enable more targeted interventions to be undertaken, resulting in more efficient and effective interventions.

4.6 Recommendations for future research

The current research available suffers from a lack of methodologically rigorous designs with the majority conducting uncontrolled pre-post designs. Future research would benefit from well controlled studies such as RCT's to ascertain that the ensuing findings are related to the intervention itself, rather than other potential extraneous and uncontrolled variables. Where possible, studies should include longer term follow-up periods to determine that improvements seen at post intervention are maintained following cessation of ED-MHL interventions.

The length of interventions varied considerably across studies with some being one off brief sessions and others spanning several weeks and hours. As a result, it is difficult to draw comparisons between studies and make definitive conclusions regarding the effective ingredients and length of treatment required to achieve change in ED-MHL interventions. Future research is required to determine the optimal programme and session length required to produce a positive effect.

Moreover, there are a number of MHL measures available and future research should focus on validating and evaluating these tools in order to improve the accuracy of measurement of ED-MHL interventions (Wei et al., 2016). Research shows that stigma is a major barrier to individuals with EDs seeking help (Hepworth & Paxton, 2007). However, none of the current studies investigated this relationship between high levels of stigma and reduced help-seeking. Future research would benefit from going beyond this and determining if reductions in stigmatising attitudes aid students at risk of EDs accessing treatment.

The concept of MHL has been defined in numerous ways across the literature (Jorm et al., 1997; Jorm, 2012). This has often led researchers to have a tendency to select certain components of MHL to investigate, rather than measuring the unified concept itself (Jorm, 2012; Spiker & Hammer, 2018). As illustrated in the current review, only two studies measured several components of MHL (Hart et al., 2012; Torres-McGehee et al., 2011), and the remaining 6 studies evaluated one or two components. Unfortunately, this has resulted in studies being heterogenous in their measurement of MHL, design and differing populations making direct comparisons between studies difficult and meta-analyses impossible. Linked to this challenge are the lack of

standardised outcome measures relevant to MHL in general and relevant to this review, ED specific MHL measures. These outcome measures have often been developed specifically for those studies, and lack reliability and validity. Therefore, it is recommended that future research assess the unified concept laid out by Jorm et al., (1997; 2012), which would enable a comparison between studies and a stronger understanding of the effectiveness of ED-MHL interventions.

4.7 Clinical Implications

Studies show that the population, community and symptomatic individuals have poor recognition of EDs (Mond et al., 2004; Mond et al., 2008; Mond et al., 2010). The current review demonstrated that ED-MHL interventions targeting students at risk of developing EDs were effective at improving ED recognition. These encouraging findings provide evidence for the continued need of educational institutions to focus on the promotion and prevention of ED difficulties in the student population. These studies could be further improved by utilising follow-up periods to determine whether there were sustained effects of the ED-MHL interventions and controlled comparisons. This would provide insight into whether the duration or 'dosing' effect of the interventions were sufficient (Hart et al., 2012).

Whilst these are encouraging findings, it is important to note that as the current review is of a university sample, it may be that the educational demographic is skewed with people being more highly educated and potentially having higher IQs. Therefore, these knowledge-based assessments might be expected to show better outcomes for student populations than if we took a community sample with a broader range of

abilities. It is therefore important that future efforts are directed not only at intervening with this high-risk population, but also intervening at a community level (Stice et al., 2013; Mond, 2013b), ensuring that ED-MHL is taught to all individuals at risk of developing EDs.

In addition, EDs are one of the most prevalent disorders in children and young people (Michaud & Fombonne, 2005). Therefore, implementing ED-MHL interventions at primary and secondary school level could potentially safeguard those entering adolescence and approaching further education, and prevent the development of long-standing EDs. This could reduce the necessity to implement ED-MHL interventions in early adulthood if already found to be effective in youth. As such, future research would benefit from targeting ED-MHL in school settings and evaluating its long-term impact through longitudinal studies.

Indeed, improving the mental health of children, young people and university students is one of the key agendas of the Governments' national policies (Department of Education, 2018; HM Government, 2017; World Health Organisation, 2010). Universities have been called upon to improve the provision of mental health support they provide their students with. There is now a University Mental Health Charter which outlines new standards to promoting university-wide mental health. Those universities which make mental health promotion and support a strategic priority will be accordingly rewarded (Department of Education, 2018).

Further to this, schools have also been incentivised to promote the mental health and well-being of students through early identification and referral to specialist mental

health services. All schools have been encouraged to identify and train 'designated senior leads for mental health' in their schools and to implement MHL programmes to support whole school approaches to improving the mental health of children and young people (HM Government, 2017; Department of Health and Social Care and Department for Education, 2017).

4.8 Conclusions

The review provided a comprehensive appraisal of the empirical research examining the effectiveness of ED-MHL interventions for students at risk of developing EDs. A range of MHL concepts were investigated across the studies including stigmatising attitudes, help-seeking intentions/knowledge, recognition, and ED knowledge including treatment, aetiology and risk factors. Conclusions about the effectiveness of ED-MHL interventions across the above domains were mixed but overall showed that interventions were effective at improving MHL. The greatest concerns relating to ED-MHL interventions involved the lack of standardised measures and pre-post, uncontrolled studies. It will therefore be important to address these in future research.

The limited number of studies in the review reflect the relative infancy of ED-MHL intervention research and the limited amount of research conducted to understand what ingredients are most effective for ED-MHL. In particular, RCTs examining interventions for individuals at risk of developing EDs, with larger sample sizes and follow-up periods would be beneficial.

Increasing our understanding of effective interventions for ED-MHL could improve university students' knowledge, recognition of EDs and reduce stigmatising attitudes

around ED. The hope is that through improving ED-MHL this will improve the

individual and community burden of EDs and promote the importance of early help-

seeking to appropriate treatments (Mond et al., 2010a, 2013b).

Part III. Empirical Study

Evaluating the Effectiveness of a Digital Mental Health Literacy Intervention for Children and Young People within a School Setting

Abstract

Background: Childhood and adolescence have been identified as a critical period for the development of mental health problems. Early mental health promotion and prevention are imperative for supporting children and young people's (CYP) mental health. The introduction of digital mental health literacy (MHL) interventions have the benefit of accessing a wider audience as well as providing cost-effective interventions. In addition, these interventions have been found to increase CYP's recognition of mental health problems and improving help-seeking behaviour. The current study extends the existing empirical research base by evaluating the effectiveness of a digital MHL intervention. The study aimed to evaluate the effectiveness of a digital MHL intervention for CYP (MindAid Youth) within a school setting utilising a pre-post-controlled trial.

Method: A longitudinal cluster control design was utilised with 331 students from five primary and secondary schools in Greater London and Surrey. Schools determined assignment into either the MindAid Youth intervention or control group for a period of 6 weeks. MHL was measured at baseline (start of lesson 1) and post intervention (end of lesson 6) using two questionnaires assessing three individual components of MHL;

mental health knowledge, help-seeking and stigma. One of the measures, the MHL vignettes assessed knowledge and help-seeking awareness of four of the most prevalent mental health problems in CYP; conduct disorder, depression, anxiety and eating disorders. The stigma scale measured general attitudes towards mental health.

Results: The MHL intervention group's knowledge of conduct disorder, depression and eating disorders improved over time compared to the control group; after controlling for pre-training knowledge scores a statistically significant difference between groups on all post intervention knowledge scores were found. MindAid Youth did not differentially effect groups' knowledge of social anxiety. No significant differences between groups on post intervention help-seeking scores were found, across any mental health problem (conduct disorder, depression, social anxiety and eating disorders). No statistically significant differences in stigmatising attitudes were found between groups on post intervention scores.

Conclusion: The results provide some promising findings suggesting that MindAid Youth is effective in improving knowledge of several common mental health problems most prevalent in CYP. However, the intervention was not impactful on youths' help-seeking and stigmatised attitudes.

1. Introduction

In recent years there has been an increased interest globally regarding CYP's mental health (Patel, Fisher, Hetrick & McGorry, 2007) and a push for early promotion and prevention programmes with CYP. Childhood and adolescence are a critical period for the development of mental health problems, with 10-20% of children and young people (CYP) affected worldwide (Kieling et al., 2011) and half of all mental health disorders first occurring by the age of 14 (Kessler et al., 2005). Epidemiological studies show that the most common mental health problems concerning CYP include depression, anxiety, eating disorders (Michaud & Fombonne, 2005) and conduct disorders (ONS, 2004).

The lack of identification and treatment at an early stage can lead to deleterious individual, social, and community problems (Merikangas et al., 2010; Kessler et al., 1995). Moreover, research suggests that early recognition and treatment may lead to better long-term outcomes (Jorm, Korten & Jacomb, 1997). However, the majority of CYP do not access or receive services when needed (Murphy & Fonagy, 2013). Stigma has also been found to be a common barrier to CYP accessing treatment (Clement et al., 2015). Developmentally this is a turbulent period for CYP with significant cognitive, physical and emotional changes taking place (Borzekowski, 2009). It is therefore critical that CYP are supported to improve their ability to recognise and understand mental health problems and encourage appropriate help-seeking (Ojio et al., 2015).

1.2 Mental health literacy

The term MHL was introduced in 1997 by Jorm and colleagues and has been defined as the 'knowledge and beliefs about mental disorders, which aid their recognition, management or prevention' (Jorm et al., 1997, p. 182). It also refers to attitudes such as stigma towards mental health disorders, which reduce recognition of mental problems and help seeking behaviour (Jorm, 2012). These authors suggested that MHL comprises seven components which include: mental health recognition, knowledge of seeking mental health information, knowledge of risk factors and causes, knowledge of self-help strategies, being aware of the professional help available, attitudes that promote recognition and help-seeking behaviour (Spiker & Hammer, 2018). However, the current study will utilise the original Jorm et al., (1997) definition as it is often thought of as the 'gold standard.' Another term commonly used in place of MHL is mental health first aid (MHFA). MHFA was developed in Australia in 2001 and is a comprehensive training course designed to support individuals in crisis or in the early stages of experiencing a mental health problem (Kitcher & Jorm, 2002).

Previous research indicates MHL levels in CYP may benefit from improvement as the limited number of studies that exist have found that CYP demonstrate poor MHL levels. Two Australian national surveys found that adolescents (12-25 years old) had poor recognition of depression, psychosis and conduct disorder (Wright et al., 2005; Kelly et al., 2006). One of these studies also investigated how adolescents would respond to a friend with a mental health problem. The findings revealed that roughly half (53%) the students reported that they would provide support to a friend, but only

a minority (23%) said they would seek the support from a responsible adult such as a parent, teacher or mental health professional (Kelly et al., 2006).

Adolescents have been found to have poor knowledge of appropriate treatment options. For example, Jorm & Wright, (2007) investigated which interventions adolescent and young adults (aged 12-25 years old) and their parents deemed as helpful for a range of mental health problems (psychosis, depression, depression with alcohol misuse and social phobia). CYP and parents were generally found to agree on which treatments were considered most helpful across all the disorders. However, these interventions were not specialist mental health services but rather general and informal sources of self-help.

In regard to stigma, studies have found that adolescents, when compared to adults have higher stigmatising attitudes and deem those with mental health problems to be personally weak (Jorm & Wright, 2007). Furthermore, CYPs increased stigmatising attitudes have been found to be a barrier to appropriate help-seeking (Yap, Wright & Jorm, 2011).

Overall these studies suggest that adolescents' recognition of mental health problems is poor. They can be unaware of the appropriate adults to seek support from for their friends, have high levels of stigma and lack awareness of appropriate evidence-based treatments for disorders.

1.2 The role of schools

Schools could play an important role in improving MHL levels for young people. The education system is in a prime position to promote and protect CYP's mental health because of the accessibility of CYP, the strong alliance CYP form with school staff over the years, and the opportunity for social and emotional growth (Clarke & Barry, 2015; Fortier, Lalonde, Venesoen, Legwegoh & Short, 2017). Schools provide an opportune place to assess indicators of mental health problems where they may be missed at home (Atkins, Graczyl, Frazier & Abdul-Adil, 2003), and can normalise mental health as part of education (Mcluckie, Kutcher, Wei & Weaver, 2014). As such, in 2017, the UK Government issued the Green Paper 'The Government's response to the Five-Year Forward View for Mental Health', which endorsed the implementation of mental health first aid (MHFA) within all secondary schools (HM Government, 2017), with the aim of increasing MHL.

1.3 Face to face MHL interventions

Accumulating evidence suggests that face to face MHL interventions can significantly improve CYP's MHL (Ojio et al., 2015; Milin et al., 2016). For example, a Japanese study found improved MHL levels for students aged 14-15 years old in school. Students' knowledge of mental health problems significantly improved as did desirable behaviours related to help-seeking at post intervention and 3-month follow-up. Students also showed a significant increase in the proportion of correct diagnoses of vignette cases of major depression and schizophrenia increasing from 38.3% and 19.1% to 94.7% and 93.6% respectively (Ojio et al., 2015).

However, a number of limitations were noted, including a small sample size, recruitment from only one school, use of a non-validated questionnaire and that students were of a limited age range (14-15 years old) reducing generalisability. A primary criticism of the study however is the lack of a control group to compare the intervention group to. Without this comparison it is difficult to determine conclusively whether the observed changes were due to the MHL intervention itself, or another extraneous variable.

A more recent study addressed some of these limitations; a randomised controlled trial was conducted across 24 schools in Canada (Milin et al., 2016) whereby changes in mental health knowledge and stigma were measured at pre and post intervention. Those in the MHL intervention group demonstrated significant improvements in mental health knowledge and reductions in stigmatising attitudes compared to the control group. In addition, improving mental health knowledge was found to significantly predict a reduction in stigmatising attitudes toward mental illness. Similar to Ojio et al's., (2015) study the mental health knowledge and stigma scales were not standardised and developed by the authors due to the absence of existing standardised psychometrically sound scales for assessing CYP's mental health. Furthermore, as the study was conducted in Canada, it remains unclear whether these results also apply to the UK education system.

1.4 Digital MHL interventions

The provision of digital MHL interventions has become more common-place due to them being increasingly accessible, cost-effective and having the capacity to reach a large number of people (Tennant et al., 2015). Findings from recent studies suggest that the internet can be an effective tool and setting for improving CYP's MHL (Blanchard et al 2011; Rickwood, 2010). For example, a systematic review of online mental health promotion and prevention interventions with young people within the school setting found significant improvements in their MHL, help-seeking behaviour and mental well-being (Clarke, Kuosmanen & Barry, 2015).

However, only one study (Livingston et al.,2013) measured MHL outcomes, investigating the effectiveness of an online social media campaign for raising mental health awareness and improving stigmatising attitudes of adolescents and young adults aged 13-25 years. Online measures were completed at baseline and 2 months following the campaign launch. The intervention was successful in raising awareness of the mental health website, however no changes in stigmatising attitudes were found post intervention. The authors suggested that the majority of respondents already had high positive attitudes at baseline and might explain their finding.

Of the twenty-eight studies reviewed two of these studies evaluated the efficacy of online stress management programmes for young people at school (Fridrici & Lohaus 2009; Van Vliet & Andrews, 2009), rather than specific MHL interventions. Neither programme taught or measured MHL outcomes. Further, six studies evaluated in the review involved computerised cognitive behavioural therapy (CBT) for depression and/

or anxiety symptoms for children ranging from 10-18 years of age. Programmes included those such as moodGYM (Calear et al., 2009; 2013; O'Kearney et al., 2006, 2009) an Australian online CBT intervention designed to prevent depression for adolescents in secondary schools (aged 12-17 years of age).

The studies overall varied in terms of their quality and the heterogeneity of content and delivery across the interventions, and whether there were significant improvements in depression and or anxiety from pre to post intervention (Clarke, Kuosmanen & Barry, 2015). It should be noted that the majority of studies were conducted in Australia, and only one in both the Netherlands and the UK. In summary, these studies suggest that online interventions can be effective for reducing mental health symptoms in CYP, however there's not conclusive evidence for improvement in MHL specifically. The current study will add to these gaps in the literature by conducting a more rigorously controlled digital MHL intervention, with a larger sample size and in a UK based school setting.

1.5 Summary of the evidence

To date, studies have demonstrated preliminary evidence that face to face MHL interventions can be effective in improving MHL in children and adolescents, resulting in increased knowledge about mental health problems, desirable help-seeking behaviours, and reduced stigmatising attitudes (Ojio et al., 2015; Milin et al., 2016). In addition, some studies have found an increase in mental health knowledge to significantly predict positive attitudes towards mental health (i.e. reduce stigmatising attitudes) (Milin et al., 2016). Further research is needed, however, with larger sample

sizes, a wider age range, more robust designs such as RCTs, and psychometrically robust measures. In addition, research would benefit from less heterogeneity among studies, in terms of delivery and content of MHL interventions. Therefore, these methodological issues need to be improved before we can state conclusive improvements in MHL levels among CYP.

Similarly, online digital MHL interventions with young people conducted in school settings have found significant improvements in their MHL, help-seeking behaviour and mental well-being (Clarke, Kuosmanen & Barry, 2015). However, most studies evaluated anxiety and depression (Calear et al., 2009; 2013; O'Kearney et al., 2006, 2009) and did not include behavioural difficulties and eating disorders which epidemiological studies have shown to be prevalent among young people (Michaud & Fombonne, 2005; ONS, 2004). So, whilst studies have shown preliminary evidence for the effectiveness of digital MHL interventions, it is unknown whether these results would be replicated in children and adolescent school populations and these additional disorders. A study investigating the effect of digital MHL interventions in school students, would therefore be of value to the field.

1.6 MindAid Youth

MindAid Youth is an easily accessible web-based app designed to improve the MHL of CYP in school settings. MindAid Youth is unique in that it comprises of 13 learning modules for common mental health difficulties. The app has four key features: TALK, QUIZ, LIBRARY and HELP (see Appendix B). It utilises evidence-based information and resources from a variety of sources, from literature and web searches and links

to quizzes and YouTube videos of CYP talking informatively about their difficulties. The basic requirement of the intervention programme in this trial was for students to explore MindAid Youth in a classroom setting and complete the four core MHL learning modules online using MindAid Youth. The selected four modules chosen were anxiety, depression, eating disorders and behavioural problems, as they are the four most common presenting problems in adolescence (Royal College of Nursing, 2017; Michaud & Fombonne, 2005; ONS, 2004).

1.7 The proposed project

Research has not yet determined whether the digital delivery of MHL interventions with CYP is effective; some studies show improvements whilst others have failed to (Clarke, Kuosmanen & Barry, 2015). Therefore, this study is another assessment of effectiveness in this developing field. In addition, research thus far has varied in its quality and there is a clear need for more rigorously controlled studies with more diverse samples of youth (Clarke, Kuosmanen, Barry 2015). The current study therefore looks to conduct a methodologically rigorous controlled study with adequate sample size.

Importantly the study will relate specifically to UK based youth, as most previous studies have been conducted in countries other than the UK, where education and health promotion campaigns differ to the UK. For example, countries such as Australia and Canada have greater public MHL promotion campaigns than in the UK and this may influence outcomes (Kutcher, McLuckie, 2010; US Department of Health and Human Services: Mental Health, 1999). Their teachers also receive training in MHL

so the baseline MHL levels may be different in the adult and youth populations overall, and in education systems specifically (Ontario Ministry of Children and Youth Services: A Shared Responsibility, 2006). Feasibility and acceptability of implementation is also likely to be affected in systems where there are different levels of MHL. Furthermore, government policy is recommending the provision of mental health education in UK school settings, yet we don't have clear evidence of what is effective within this context.

The current study seeks to address a gap in the literature by implementing a freely available digital MHL intervention, MindAid Youth, and to test its effectiveness with CYP in a school setting. A pre-post longitudinal cluster control design will be utilised with primary and secondary school students. The results of the project will help inform school policy and recommendations for MHL interventions with CYP and if deemed effective inform the continued development of MindAid Youth.

The definition of MHL in this study includes 3 variables; knowledge, help-seeking and stigma related to 4 common youth mental health problems - conduct disorder, depression, social anxiety and eating disorders. The hypotheses were written separately as this allowed for specific components of MHL to be looked at in detail. This was important as some disorders such as eating disorders have not been investigated before. In addition, the majority of studies in the field have investigated MHL by disorders and have generally reported them by each component of MHL (i.e. knowledge, help-seeking etc.) as defined by Jorm and colleague's definition (1997; 2012) (Ojio et al., 2015; Perry et al., 2014; Milin et al., 2016; Hart, Mason, Kelly, Cvetkovski & Jorm, 2016). There is also for example, evidence in the literature to

suggest that the recognition of depression is more commonly recognised than psychosis (Hart et al., 2016).

The current study had an overall research question with associated hypotheses; does MindAid Youth improve MHL in a sample of CYP within a school setting? Therefore, the associated hypotheses was as follows:

1. CYP receiving MindAid Youth intervention will show improvements in knowledge of conduct disorder and help-seeking awareness compared to a control group.

2. CYP receiving MindAid Youth intervention will show improvements in knowledge of depression and help-seeking awareness compared to a control group.

3. CYP receiving MindAid Youth intervention will show improvements in knowledge of social anxiety and help-seeking awareness compared to a control group.

4. CYP receiving MindAid Youth intervention will show improvements in knowledge of eating disorders and help-seeking awareness compared to a control group.

5. CYP receiving MindAid Youth intervention will show improvements in stigmatising attitudes compared to a control group.

2. Method

2.1 Design

The current study utilised an experimental, longitudinal pre-post cluster control design in order to evaluate the effectiveness of a digital MHL intervention in school settings. All participants completed their baseline measures at the start of lesson 1 and again post-intervention at the end of lesson 6. MHL measures were collected at baseline (week 1) prior to receiving MindAid Youth intervention and post intervention (6 weeks later). Schools were not randomly allocated into groups instead they were given the option to decide participation as a control or intervention group. This facilitated engagement and retention of schools.

2.2 Participants

Eligible participants were primary (year 6) and secondary (years 7-8) school students (n = 432, aged 10-13years). Twenty-five schools in total were approached in Greater London and Surrey by email (Appendix C) and were invited to participate in the research project (see Figure 1. for full details). Schools were identified through opportunist sampling through two means: The South East Research Network for Schools database held at Royal Holloway and a database of schools from an NHS led Child and Adolescent Mental Health Schools Service in London. Schools which expressed an interest in the project received a follow-up call and information sheets by email and were offered a meeting to determine participation. The meeting with the researcher involved a detailed discussion of the research project, an introduction to

MindAid Youth, along with agreement to participation in the control or intervention arms of the project.

Thirteen schools (54.2%) expressed an interest in participating, and 5 schools (38.5%) agreed to take part following the introductory meeting. Schools self-selected allocation into one of two groups (control and intervention group). Two schools were placed into the intervention group (n = 182; 84) and three into the control group (n = 51; 56; 59). In total 5 primary and secondary schools participated in the study.

Once participation was confirmed an internally identified school lead for the project sent out parental and child friendly information sheets (Appendix D and C) and parents were asked to send back an opt out slip if they wanted to withdraw their child from participating. Parents were given two weeks to opt their child out of the research project. Across the five schools 22 students in total were withdrawn from participating by their parents. All other children took part in the research project. Students who were withdrawn from participation were taught their normal curriculum in another room with a supply teacher.

As an incentive to participate, schools were offered access to MindAid Youth if in the control group and continued use if in the intervention group. The control group could only receive the intervention following conclusion of the study. Other benefits included schools being provided with an overview of the baseline mental health literacy levels of their students to inform curriculum planning and support in this area.

Following the intervention phase 101 students were removed from the data set due to incomplete data (23.8%), absence due to sickness (25.7%) or COVID-19 related absence (50.5%). Demographic characteristics of recruited participants are presented in Table 1.

Figure 1.

Flow of participant allocation to groups
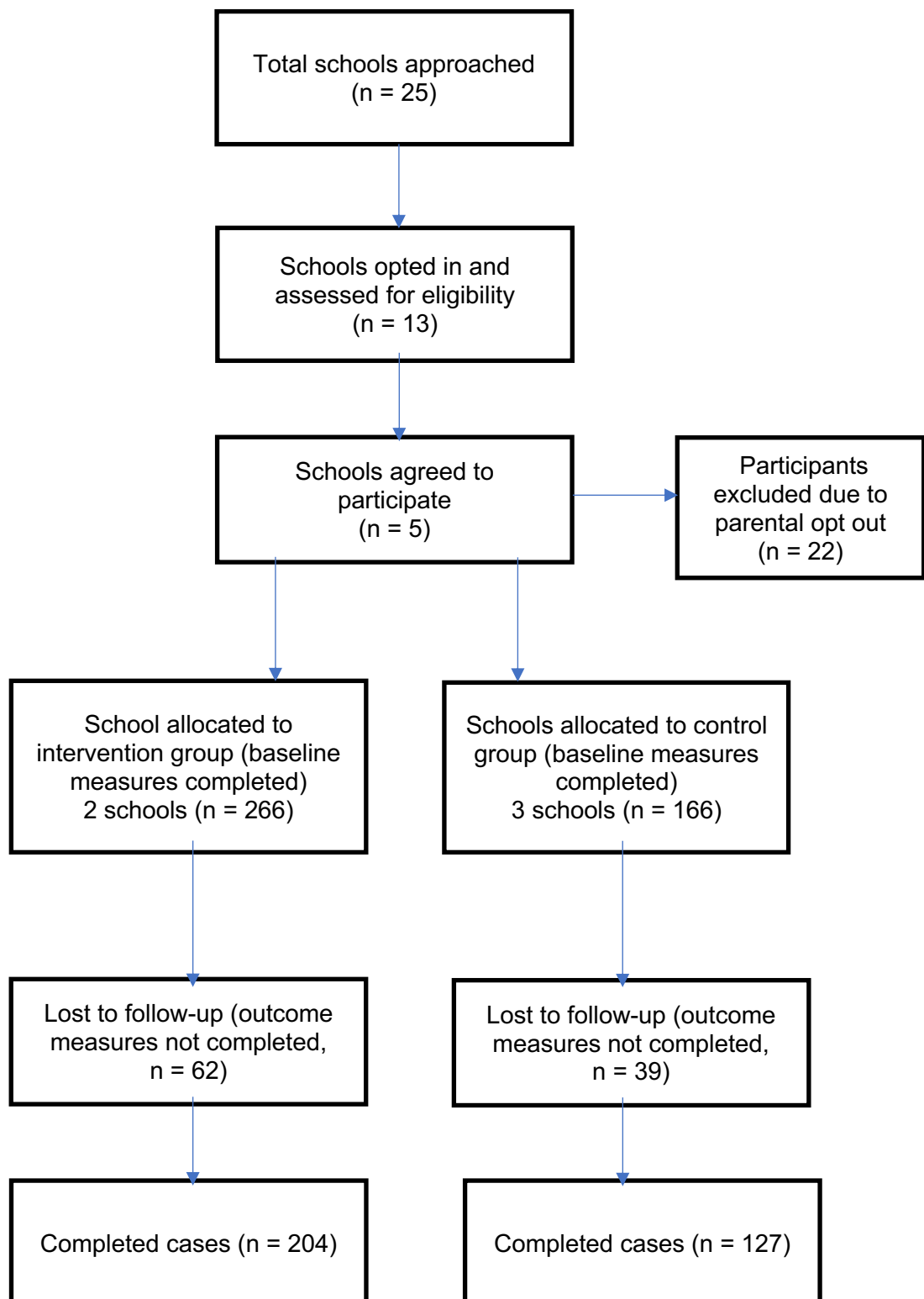
Table 1.

Demographic characteristics of control and intervention groups

Characteristics	Intervention group *n = 204*	Control group *n = 127*
Gender *n (%)*		
Male	134 (65.7)	68 (53.5)
Female	70 (34.3)	59 (46.5)
Age (yrs)		
Mean (SD)	10.7 (1.022)	10.6 (.994)
Ethnicity *n* (%)		
Caucasian British	94 (46.1)	34 (26.8)
Caucasian Irish	3 (1.5)	2 (1.6)
Caucasian Other	69 (33.8)	11 (8.7)
Black African	0	9 (7.1)
Black Caribbean	0	5 (3.9)
Other Black	1 (0.5)	6 (4.7)
Asian Indian	4 (2)	1 (0.8)
Asian Pakistan	3 (1.5)	3 (2.4)
Asian Bangladeshi	0	29 (22.8)
Chinese	2 (1)	3 (2.4)
Other Asian	3 (1.5)	4 (3.1)
White and Black Caribbean	1 (0.5)	8 (6.3)
White and Black African	5 (2.5)	3 (2.4)
White and Asian	10 (4.9)	0
Other mixed group	9 (4.4)	9 (7.1)
Mental health problem *n (%)*		
Yes	26 (12.7)	15 (11.8)
No	178 (87.3)	112 (88.2)
Family mental health problem		
Yes	52 (25.5)	40 (31.5)
No	152 (74.5)	87 (68.5)
Friend mental health problem		
Yes	65 (31.9)	44 (34.6)
No	139 (68.1)	83 (65.4)

2.3 The intervention

MindAid Youth is a web-based app based on a mental health first aid approach which is designed to improve young peoples' knowledge and skills about mental health. MindAid Youth was developed from MindAid, an earlier app, to support teachers in recognising common mental health difficulties in their pupils and supporting them to seek help. The contents of MindAid were adapted to make it more user friendly and appropriate for CYP.

MindAid Youth is comprised of four functions: Talk, Quiz, Library and Help. Talk provides guidance to pupils on how to talk about their worries, ask for help and listen and support friends. Quiz assists the young person in identifying if any mental health concerns are serious. The Library section consists of 13 bite size learning modules for common mental health difficulties (based on evidence-based information and resources). Each learning module contains information about what the mental health problem is, information about getting help and some basic first line self-help coping tools. There are also additional links to YouTube videos and quizzes related to each problem. The Help section is GPS localised, providing details of local organisations that can be contacted to get the appropriate advice or support needed. MindAid Youth incorporates all components of the MHL definition and interventions detailed by Jorm and colleagues (Jorm et al., 1997; Jorm, 2012).

The basic requirement of the intervention programme for the study were for participants to explore MindAid Youth in a classroom setting and complete the four

core MHL learning modules online using MindAid Youth. These modules were chosen as the 4 most common presenting problems in adolescence (Royal College of Nursing, 2017; Michaud & Fombonne, 2005; ONS, 2004). They are as follows: (1) Conduct disorders, (2) Depression, (3) Social anxiety and (4) Eating disorders. However, one primary school opted out of learning about eating disorders due to their concerns about the students being taught this topic area when aged 10-11years. As a result, they only completed the first three modules.

MindAid Youth was developed to be a self-contained application used independently by the young person. After a brief introduction to its use they should be able to navigate their way through each of the modules in turn, reading the tips, watching the videos and attempting the quizzes. However, it was implemented slightly differently for primary and secondary schools. One of the primary schools incorporated a blended approach to the intervention which incorporated brief group discussion and support from the teacher supervising the MindAid Youth session.

2.4 Outcome measures

Participants competed a demographic questionnaire and two MHL self-report questionnaires. All participants completed hard copies of questionnaires. The option to complete questionnaires via an online platform survey 'Qualtrics' was offered. However, due to the large number of students completing questionnaires at any one point in time, using the school computer facilities was not feasible and as such all participants completed hard copies.

2.4.1 Demographic data

Baseline data was collected including socio-demographic characteristics of the participants (age, gender, ethnicity), history of mental health problems in participant or family, and contact with friends who have mental health problems as these have been associated with MHL levels (Appendix F).

The following MHL measures were completed pre and post intervention by both the intervention and control groups:

2.4.2 Mental Health Vignettes

Participants' knowledge about mental health difficulties, including recognition, knowledge of appropriate treatments and help-seeking awareness were assessed using 4 vignettes (Appendix G). The vignettes (Loades & Mastroyannopoulou, 2010) were based on existing measures (Day, 2002; Jorm et al., 2005; Jorm et al., 2007) of the most prevalent disorders in school aged children (Royal College of Nursing, 2017; Michaud & Fombonne, 2005; ONS, 2004): social anxiety disorder (SAD), depression with suicidal thoughts, an unspecified eating disorder and conduct disorder. Following each vignette participants were asked a series of questions adapted from previous studies using these vignettes (Hart, Mason, Kelly, Cvetkovski & Jorm, 2016; Loades & Mastroyannopoulou, 2010; Reavley & Jorm, 2011). These questions were adapted to relate specifically to the content of MindAid Youth. In addition, the vignettes and questions were modified to ensure they were developmentally appropriate, including child friendly and accessible language following the Hart et al. (2016) TeenAid Survey.

The vignettes have been extensively utilised in previous studies of MHL with teachers and were reviewed by clinical psychologists and piloted on a sample of trainee clinical psychologists who reported face and content validity (Loades & Mastroyannopoulou, 2010). However, their reliability, construct and predictive validity and sensitively to change have not been measured.

Whilst the vignettes have been used with samples of CYP aged 12 years and above this was the first time they had been used with children as young as 10 years old. Therefore, careful attention was paid to the developmental appropriateness of the content through consultation with supervisors and teachers. The vignettes were piloted in the first data collection session in primary schools (CYP aged 10-11 years old and teachers) and feedback was sought from them and amendments made. The vignettes were chosen as they have been widely utilised with CYP and university students aged 12-25 years (Jorm, Wright & Morgan, 2007; Hart et al., 2016; Reavely & Jorm 2011) which allowed comparison between studies. In addition, there is not a well validated, reliable measure available for CYP of this age.

The vignette questionnaire has a total minimum score of four and a maximum of 108. For the individual vignettes there is a total minimum score of 1 and a total maximum score of 27. This is comprised of knowledge and help-seeking awareness sub-scales. Knowledge comprised of recognition, identification of mental health disorders, symptomology and causes, with a minimum score of 1 and a maximum score of 10. Help-seeking awareness comprised of knowledge of self-help interventions, knowledge of appropriate professionals, and confidence in helping, with a minimum score of 1 and a maximum score of 17. Higher scores indicate higher levels of MHL.

The help-seeking awareness sub-scale is comprised of both help-seeking knowledge and help-seeking intentions questions.

Each vignette has a series of questions with either Likert scale options, free text required or tick boxes indicating preferences for one of several options.

The knowledge sub-scale consisted of the following questions:

Participants were asked to:

(i) identify whether they thought the young person depicted in the vignette had a mental health problem,

(ii) if so, to name the identified problem,

(iii) list 5 symptoms they thought the young person was displaying,

(iv) and list 3 reasons they thought the young person might be behaving this way.

The help-seeking awareness sub-scale consisted of the following questions:

Participants were asked:

(i) to identify what they could do to help the young person from a list of options,

(ii) if the young person were to seek help how helpful would they rate a series of health professionals,

(iii) of the 7 health professionals listed which one would they rate as most helpful,

(iv) to rate which treatment/s they think would be most helpful for the young person,

(v) to report how confident they felt helping the young person.

2.4.3 Stigmatising attitudes

A subscale of the Knowledge and Attitudes Survey (KAS), 'attitudes towards mental illness' (Appendix G) was utilised to measure participants' stigmatising attitudes towards individuals with mental health difficulties. The KAS was designed specifically for youth samples and has been used in several previous studies (Kutcher & Wei, 2014; McLuckie, Kutcher et al., 2014; Milin et al., 2016) due to the lack of psychometrically robust instruments to measure MHL outcomes in young people (Wei et al., 2013).

The attitudes towards mental illness sub-scale contains 12 items rated on a Likert scale. Participants were required to indicate their attitudes towards a series of statements about mental health problems ranging from 1 (strongly disagree) to 7 (strongly agree). It included statements such as, 'most people with mental health problems are too disabled to work' and 'I would not be close friends with someone I knew with a mental health problem.' A total maximum score of 84 can be obtained and a minimum total score of 7; with higher scores indicating more positive attitudes towards people with mental health difficulties. Certain words such as 'illness' were substituted for mental health 'problem' to be in line with a British vernacular.

2.5 Service-user involvement

During induction meetings with teachers there was opportunity to gather feedback on improvements to the design of the research project. One school provided extensive feedback which shaped measures and the presentation/content of the MindAid Youth

intervention. For example, it was suggested that background colours have an impact on the readability of text for people with and without dyslexia, and therefore this was adapted. Some language and content were also changed in the main four modules of MindAid Youth in order to improve the developmental appropriateness of the material. Other suggestions regarding the interface and user experience of Mindaid Youth were proposed, however, given the time limit and lack of funding, these could not be implemented.

2.6 Procedure

The current empirical study was part of a broader study with two combined projects with different researchers (S.G and G.T). The primary researcher (S.G) conducted the study, designed the project, developed the app, recruited schools and analysed the data. The secondary researcher (G.T) supported the primary researcher with data collection and data entry.

Both researchers (S.G and G.T) collected baseline and post-intervention questionnaires across all schools. On the first day of each school's trial, in lesson 1 all participants were provided with a demographic information sheet to complete. Those in the intervention group also received a child friendly information sheet and a brief 10-minute PowerPoint Presentation outlining how to use MindAid Youth and what participation involved (Appendix F). Participants in the control group were briefed on the purpose of the study and what it involved for them; any questions were answered for both groups. The school lead was encouraged to contact the researcher outside of

the sessions if additional questions came to light or any technical problems were noted with the application.

Subsequent to this, all participants completed pre outcome measures. This was followed by the intervention group completing 4 weekly lessons of the core modules on MindAid Youth (anxiety, depression, conduct disorder/anger, eating disorders), all 45 minutes in length and embedded within the standard curriculum. The control group attended their normal lessons as usual.

Four schools completed all four core modules and one school completed three, excluding the eating disorder vignette due to concerns about introducing this module. The same outcome measures were then completed at week 6 by all participants. To ensure fidelity, participants were required to self-report their completion of a module through a tick box sheet after each lesson. In addition, a register was kept by the teacher confirming whether the participant had attended the class and successfully completed each module. Catch up sessions were provided for those who missed a session due to illness.

To ensure anonymity participants were provided with unique ID codes linked to their baseline and post intervention questionnaires. Data was stored securely at the respective school and university sites. Hard copies of the responses will be kept for four years in line with university procedure.

2.7 Ethical approval

Ethical approval was granted for this research by the Royal Holloway University Research Ethics Committee (application ID 1640) (Appendix I and J). Whilst it was not expected that using MindAid Youth should cause CYP distress, a formalised procedure for managing risk and potential distress was put in place (Appendix K).

2.8 Power analysis

An a-priori power analysis was carried out using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) and showed that a sample size of 111 would be required (55.5 in each group) to give an 80% power of detecting a medium effect size (as found in previous studies; Hart, Mason, Kelly, Cvetkovski & Jorm, 2016) using a mixed MANOVA.

2.9 Data analysis

2.9.1 Quantitative analysis

The data was analysed using SPSS Statistics Version 21. Descriptive statistics, means, frequencies and percentages were gathered to examine the distribution of participants' demographic characteristics and baseline MHL scores for the whole sample. Due to baseline differences between groups in MHL scores, ethnicity and gender a multivariate analysis of covariance (MANCOVA) was used to compare the intervention to the control group. Specifically, four mixed model MANCOVAs were used to analyse continuous variables (MHL vignette knowledge and help-seeking

scores) to examine whether there was a change in post intervention MHL scores whilst covarying pre-training scores between the intervention and control group.

Where a significant effect was found individual analysis of covariance (ANCOVA) were conducted separately for knowledge and help-seeking dependent variables to determine where the difference arose. An analysis of covariance (ANCOVA) was also used to compare the intervention and control group on post intervention stigma scores while controlling for pre-training scores.

1. Results

3.1 Missing data

There were 101 participants with missing data at post intervention. This was due to incomplete measure completion though present (23.8%), absence due to sickness (25.7%) and COVID-19 related absence (50.5%). Due to the large initial sample size these participants were removed and a reduced sample size analysed (n = 331).

3.2 Socio-demographic information

Demographic variables were assessed between the intervention and control groups to determine equivalence between groups at baseline and for those variables considered potential confounders. These included age, gender, ethnicity, baseline mental health literacy levels, students having a mental health problem, having a family

member with a mental health problem, and having a friend with a mental health problem.

An independent t-test revealed no significant differences in age between groups at baseline, however significant differences were found between groups at baseline for MHL scores. Chi-squared tests revealed no significant differences at baseline between the intervention and control groups for students having a mental health problem, family or friends. Chi-squared tests revealed a significant difference at baseline between groups for ethnicity and gender. Therefore, these three variables (MHL score, ethnicity and gender) were controlled for in the analyses.

3.3 Assumptions and analyses

Prior to conducting the analyses, the distribution of scores was calculated for each variable. The distribution of scores on the stigma scale at baseline and post intervention were negatively skewed. Similarly, the anger, depression, eating disorder and social anxiety vignettes at baseline were negatively skewed. All skewed variables were transformed resulting in normal distributions. The skew and kurtosis for all other variables were considered within normal limits; a distribution was considered normal if z (skew) < 2.58 (p > .01) or even < 3.29 (p > .001).

To examine any potential outliers in the data boxplots of all variables were examined. Sixteen outliers were identified: three at baseline for the depression vignette and one for the social anxiety vignette for their help-seeking awareness scores, four post intervention for the conduct disorder vignettes, three for the depression vignette, four

for the social anxiety vignette and one for the eating disorders vignette for their help-seeking awareness scores. Data was considered an outlier if the data points exceeded three standard deviations above or below the variable mean. All the above were considered extreme outliers and the data removed. Due to the large sample size this approach was favoured over winzorising.

3.4 Hypothesis 1: CYP receiving MindAid Youth intervention will show improvements in knowledge of conduct disorder and help-seeking awareness compared to a control group.

Tables 2, 3, 4 and 5 show percentages and mean scores for the conduct disorder, depression, social anxiety and eating disorder vignettes for each item, and the total score for knowledge and help-seeking awareness for each group.

A mixed model MANCOVA was used to compare knowledge and help-seeking awareness scores for conduct disorder at post intervention after covarying knowledge and help-seeking scores at pre-testing. There was a statistically significant overall effect of MindAid Youth on mental health knowledge and help-seeking awareness post intervention ($F(2,322)=4.302$, $p=.014$). A follow up ANCOVA was used to compare the effectiveness of MindAid Youth separately on knowledge and help-seeking awareness scores. After controlling for knowledge pre-training scores there was a statistically significant difference between groups on post intervention knowledge scores ($F(2,328)=7.827$, $p=.005$) with the intervention group (mean=4.3) scoring significantly higher on post intervention knowledge compared to the control group (mean=3.5).

However, after controlling for pre-training help-seeking awareness scores, no significant difference was found between groups on post intervention help-seeking awareness scores ($F(2,324)=1.580$, $p=.210$).

Table 2.

Conduct disorder vignette questionnaire breakdown by group

Conduct disorder (Billy Vignette)	Intervention		Control	
	Pre (n=204)	Post (n=204)	Pre (n=127)	Post (n=127)
Identified as MH problem	176 (86.3%)	176 (86.3%)	87 (68.5%)	69 (54.3%)
Correct diagnosis	75 (36.8%)	90 (44.1%)	54 (42.5%)	46 (36.2%)
Symptom recognition (0-5)	1.9 (1.1)	2.1 (1.1)	1.6 (1.2)	1.6 (1.3)
Causes (0-3)	0.9 (0.7)	0.9 (0.7)	0.7 (0.7)	1.0 (0.8)
Total knowledge score (max 10)	3.9 (1.7)	4.3 (1.9)	3.5 (1.8)	3.5 (2.0)
Knowledge of self-help interventions (0-3)	1.8 (0.8)	1.9 (0.7)	1.7 (0.9)	1.5 (0.9)
Professionals rated as helpful (0-4)	2.9 (0.9)	2.8 (1.1)	3.0 (1.0)	2.6 (1.0)
Professionals rated as most helpful	134 (65.7%)	122 (59.8%)	66 (51.9%)	48 (37.8%)
Approaches rated as helpful (0-4)	3.2 (1.1)	3.0 (1.0)	3.0 (1.0)	3.0 (1.2)
Confidence in helpful (0-5)	2.5 (1.0)	2.6 (1.1)	2.9 (1.3)	3.1 (1.3)
Total help-seeking score (max 17)	11.2 (2.4)	10.9 (2.8)	11.2 (2.9)	10.6 (2.9)

Note: Frequency (%) and means (SD) reported.

Figure 2.

Conduct disorder mental health knowledge change over time

Conduct disorder vignette

Figure 3.

Conduct disorder help-seeking awareness change over time

Conduct disorder vignette

3.5 Hypothesis 2: CYP receiving MindAid Youth intervention will show improvements in knowledge of depression and help-seeking awareness compared to a control group.

A mixed model MANCOVA was used to compare knowledge and help-seeking awareness scores of depression at post intervention after covarying knowledge and help-seeking awareness scores at pre-testing. There was a statistically significant overall effect of MindAid Youth on mental health knowledge and help-seeking awareness post intervention scores ($F(2,321)=18.942$, $p=.000$). A follow up ANCOVA was then used to compare the effectiveness of MindAid Youth separately on knowledge and help-seeking awareness scores. After controlling for knowledge pre-training scores there was a statistically significant difference between groups on post intervention knowledge scores ($F(2,328)=37.093$, $p=.000$) with the intervention group (mean=5.7) scoring significantly higher on post intervention knowledge scores compared to the control group (mean=3.9). However, no significant difference was found between groups on post intervention help-seeking awareness scores ($F(2,323)=.120$, $p=.729$).

Table 3.

Depression vignette questionnaire breakdown by group

Depression (John Vignette)	Intervention		Control	
	Pre (n=204)	Post (n=204)	Pre (n=127)	Post (n=127)
Identified as MH problem	157 (76.9%)	152 (74.5%)	77 (60.6%)	73 (57.5%)
Correct diagnosis	94 (46.1%)	125 (61.3%)	61 (48%)	60 (47.2%)
Symptom recognition (0-5)	2.7 (1.5)	3.1 (1.5)	1.9 (1.5)	1.9 (1.4)
Causes (0-3)	0.8 (0.8)	1.2 (0.8)	0.7 (0.9)	0.9 (0.9)
Total knowledge score (max 10)	4.7 (2.2)	5.7 (2.3)	3.8 (2.5)	3.9 (2.3)
Knowledge of self-help interventions (0-3)	1.9 (0.6)	1.9 (0.5)	1.9 (0.7)	1.7 (0.8)
Professionals rated as helpful (0-4)	3.1 (0.9)	2.9 (1.1)	2.9 (1.1)	2.8 (1.0)
Professionals rated as most helpful	99 (48.5%)	103 (50.5%)	51 (40.2%)	40 (31.5%)

Approaches rated as helpful (0-4)	2.6 (1.0)	2.5 (1.0)	2.7 (1.1)	2.6 (1.2)
Confidence in helpful (0-5)	3.9 (0.9)	3.7 (1.1)	4.0 (1.2)	3.9 (1.2)
Total help-seeking score (max 17)	11.9 (2.1)	11.4 (2.3)	12.0 (2.8)	11.3 (2.7)

Note: Frequencies (%) and means (SD) are reported.

Figure 4.

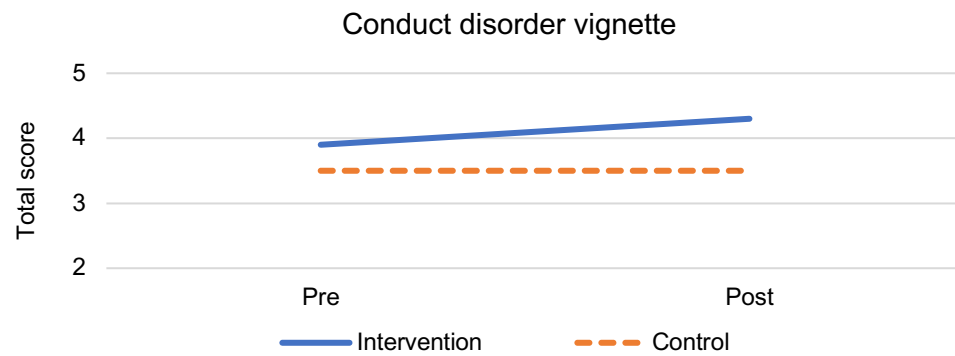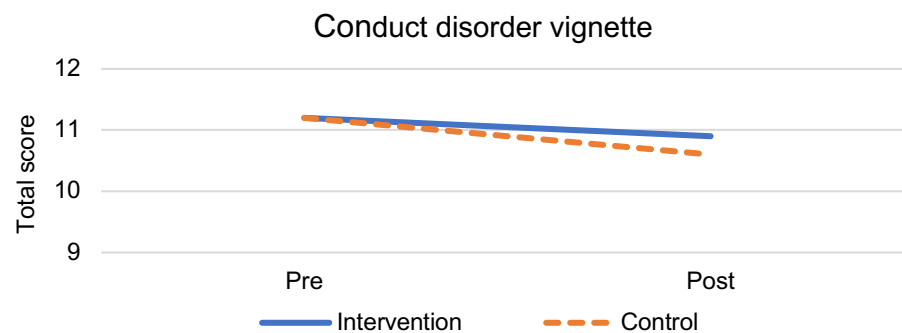*Depression mental health knowledge change over time*
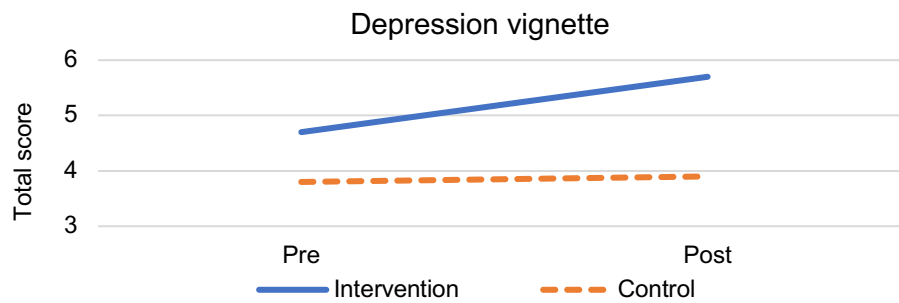
Figure 5.

Depression help-seeking awareness change over time
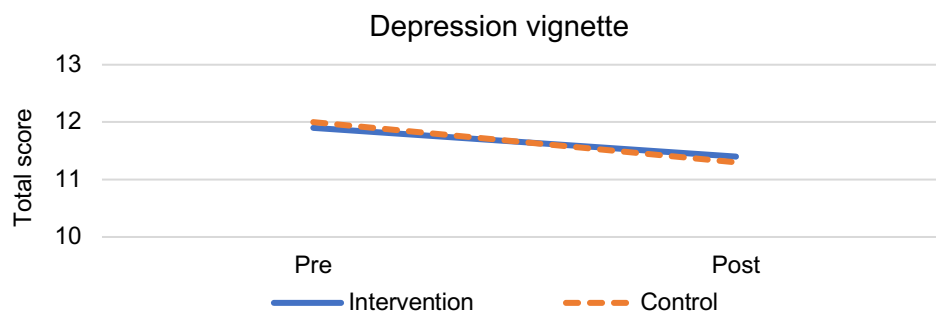
3.6 Hypothesis 3: CYP receiving MindAid Youth intervention will show improvements in knowledge of social anxiety and help-seeking awareness compared to a control group.

A mixed model MANCOVA was used to compare knowledge and help-seeking awareness scores of social anxiety at post intervention after covarying knowledge and help-seeking awareness scores at pre-testing. Unlike the previous findings reported above no significant overall effect on social anxiety knowledge and help-seeking awareness scores was found ($F(2,322)=.049$, $p=.952$). This suggests that MindAid Youth did not differentially effect groups on knowledge and help-seeking awareness scores.

It is important to highlight that CYPs overall mean knowledge score for social anxiety was the lowest for all 4 disorders. In addition, the percentage of CYP who correctly identified social anxiety as a mental health problem was much lower than for conduct disorder and depression and slightly lower than for eating disorders.

Table 4.

Social anxiety disorder vignette questionnaire breakdown by group

Social anxiety (Jeanie Vignette)	Intervention		Control	
	Pre (n=204)	Post (n=204)	Pre (n=127)	Post (n=127)
Identified as MH problem	80 (39.2%)	81 (39.7%)	44 (34.6%)	36 (28.3%)
Correct diagnosis	42 (20.6%)	47 (23.0%)	26 (20.4%)	27 (21.2%)
Symptom recognition (0-5)	1.3 (1.2)	1.1 (1.0)	0.8 (1.0)	1.0 (1.3)
Causes (0-3)	0.3 (0.6)	0.4 (0.5)	0.4 (0.7)	0.6 (0.9)
Total knowledge score (max 10)	2.2 (1.9)	2.1 (1.7)	1.8 (1.8)	2.2 (2.3)
Knowledge of self-help interventions (0-3)	2.1 (0.9)	2.0 (0.8)	1.9 (0.9)	1.8 (0.9)
Professionals rated as helpful (0-4)	2.9 (1.1)	2.8 (1.1)	2.8 (1.1)	2.7 (1.2)
Professionals rated as most helpful	51 (25%)	56 (27.5%)	34 (26.8%)	26 (20.5%)
Approaches rated as helpful (0-4)	2.5 (1.2)	2.5 (1.1)	2.4 (1.2)	2.4 (1.3)
Confidence in helpful (0-5)	3.9 (1.1)	3.8 (1.1)	4.0 (1.1)	4.0 (1.2)
Total help-seeking score (max 17)	11.5 (2.7)	11.3 (2.5)	11.4 (2.7)	11.1 (3.0)

Note: Frequencies (%) and means (SD) are reported.

Figure 6.

Social anxiety mental health knowledge change over time
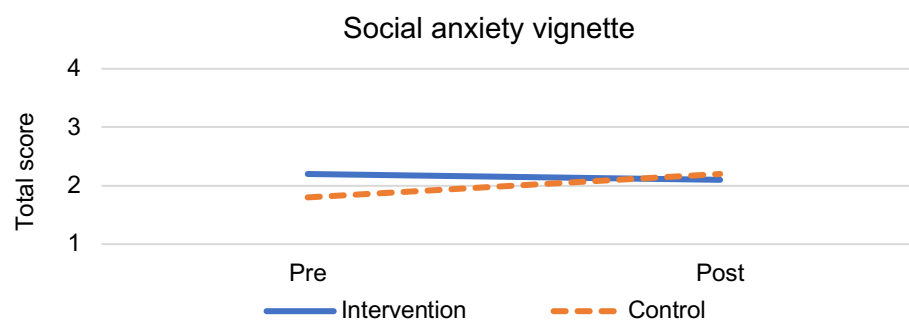
Figure 7.

Social anxiety help-seeking awareness change over time

Social anxiety vignette
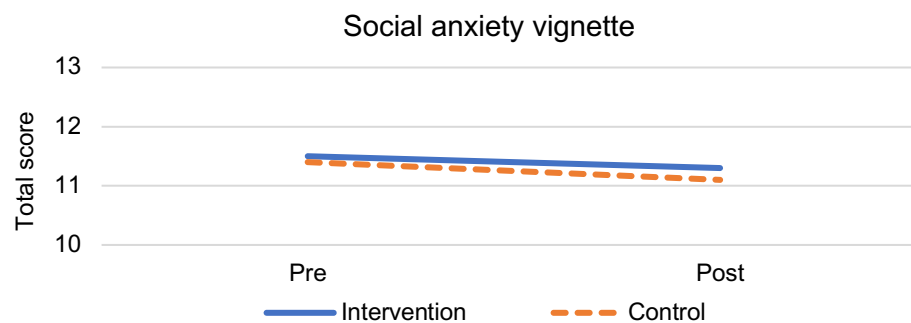
3.7 Hypothesis 4: CYP receiving MindAid Youth intervention will show improvements in knowledge of eating disorders and help-seeking awareness compared to a control group.

A mixed models MANCOVA was used to compare knowledge and help-seeking awareness scores of eating disorders at post intervention after covarying knowledge and help-seeking awareness scores at pre-testing. There was a statistically significant overall effect of MindAid Youth on mental health knowledge and help-seeking awareness post intervention scores (F(2,329)=6.979, p=.001). A follow up ANCOVA was used to compare the effectiveness of MindAid Youth separately on knowledge and help-seeking awareness scores. After controlling for knowledge pre-training scores there was a statistically significant difference between groups on post intervention knowledge scores (F(2,242)=6.882, p=<.001) with the intervention group

(mean=2.9) scoring significantly higher on post intervention knowledge scores compared to the control group (mean=1.9). However, no significant difference was found between groups on post intervention help-seeking awareness scores ($F(2,241)=.232$, $p=.630$).

Table 5.

Eating disorder vignette questionnaire breakdown by group

Eating disorders (binge eating) (Simon Vignette)	Intervention		Control	
	Pre (n=125)	Post (n=125)	Pre (n=120)	Post (n=120)
Identified as MH problem	67 (53.6%)	67 (54.6%)	49 (40.8%)	42 (35.0%)
Correct diagnosis	16 (12.8%)	23 (18.4%)	24 (20%)	19 (15.8%)
Symptom recognition (0-5)	1.5 (1.5)	1.9 (1.4)	1.1 (1.3)	1.1 (1.3)
Causes (0-3)	0.3 (0.6)	0.4 (0.5)	0.3 (0.6)	0.6 (0.9)
Total knowledge score (max 10)	2.4 (2.0)	2.9 (2.0)	2.0 (2.1)	1.9 (2.1)
Knowledge of self-help interventions (0-3)	1.0 (1.2)	0.8 (1.1)	0.8 (1.0)	0.7 (1.0)
Professionals rated as helpful (0-4)	2.7 (1.3)	2.6 (1.3)	2.7 (1.2)	2.6 (1.3)
Professionals rated as most helpful	32 (25.6)	39 (31.2)	22 (18.3)	27 (22.5)
Approaches rated as helpful (0-4)	2.9 (1.2)	2.8 (1.2)	2.7 (1.3)	2.6 (1.3)
Confidence in helpful (0-5)	3.1 (1.3)	3.2 (1.2)	3.4 (1.3)	3.5 (1.4)
Total help-seeking score (max 17)	10.0 (3.1)	9.7 (2.9)	9.8 (2.9)	9.7 (2.8)

Note: Frequencies (%) and means (SD) are reported.

Figure 8.

Eating disorder mental health knowledge change over time

Eating disorder vignette

Total score

4
3
2
1

Pre   Post

—— Intervention   ---- Control
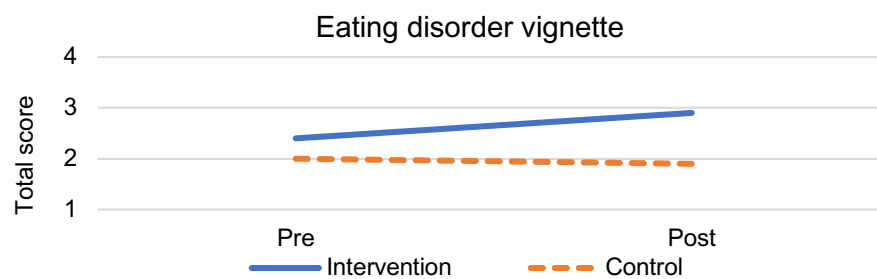
Figure 9.

Eating disorder help-seeking awareness change over time

Eating disorder vignette

Total score

12
11
10
9

Pre   Post

—— Intervention   ---- Control
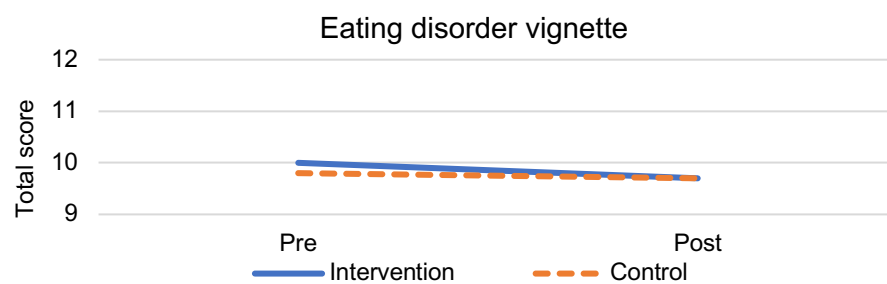
3.8 Hypothesis 5: CYP receiving MindAid Youth intervention will show improvements in stigmatising attitudes compared to a control group.

An ANCOVA was used to compare the effectiveness of MindAid Youth separately on stigmatising attitudes. After controlling for pre-training stigma scores, no statistically significant difference between groups on post intervention total scores over time was found (F(2,311)=3.539, p=.061).

Table 6.

Stigma questionnaire breakdown by group

Stigma Questionnaire	Intervention		Control	
	Pre (n=195)	Post (n=195)	Pre (n=119)	Post (n=119)
Mean Score (SD) Total score (max 84)	65.7 (10.4)	68.5 (11.4)	67.9 (11.8)	68.4 (12.5)

Note: Means (SD) are reported.

1. Discussion

4.1 Effectiveness of MindAid Youth

This is the first known pre-post-controlled comparison study to successfully implement MindAid Youth in UK based primary and secondary school settings. The study also adds to the evidence-base for the effectiveness of digital MHL interventions with CYP (Ojio et al., 2015; Milin et al., 2016; Clarke, Kuosmanen & Barry, 2015).

The overall aim of the study was to evaluate a digital MHL intervention for CYP in a school setting. Hypotheses 1 to 4 investigated whether CYP receiving MindAid Youth demonstrated improved mental health knowledge and help-seeking awareness compared to a control group across the four disorders (conduct disorder, depression, social anxiety and eating disorders). The fifth hypothesis investigated whether CYP receiving MindAid Youth showed reduced stigmatising attitudes around mental health compared to a control group.

The findings overall suggest that MindAid Youth was successful in improving CYP's mental health knowledge of conduct disorder, depression and eating disorders compared to a control group. Only one study assessed one of the same disorders as the present study, depression, although it was a face to face intervention rather than a digital MHL intervention (Ojio et al., 2015). Ojio et al's., (2015) study found consistent results with the current study showing that the proportion of correct diagnoses of major

depression reported by CYP increased substantially from pre to post intervention from 38.3% to 94.7%. Similarly, MindAid Youth demonstrated this effect but with a more modest increase from 46.1% to 61.3%.

Although the current study wasn't as effective as the face to face intervention, there were still improvements in recognition for depression. However, Ojio et al's., (2015) study was limited by a small sample size, they recruited from only one school and lacked a control group. Therefore, it is difficult to conclude that the MHL intervention was responsible for the changes observed. Whereas with the current study, there was a more robust approach to evaluating its outcomes, comparing it to a control group, with a large sample size and across different school settings. In addition, the current study evaluated the most prevalent mental health problems, showing improvements in mental health knowledge across the majority of disorders.

Milin et al., (2016) similarly demonstrated an improvement in mental health knowledge scores compared to the control group with mean scores of 8.12 at baseline and 8.82 post intervention. MindAid Youth also found improvements but again these were more modest, with baseline mean knowledge scores of 4.7 and at post intervention increasing to 5.7 compared to the control group. However, importantly Milin et al's., (2016) study is not directly comparable in terms of magnitude of change as they used different knowledge questionnaires to the current study. The current study findings build upon the accumulating evidence for the effectiveness of face to face MHL interventions showing improvements in MHL knowledge for young people (Ojio et al., 2015; Milin et al., 2016).

Despite the improvements observed across the disorders above, MindAid Youth was not successful in improving CYP's mental health knowledge of social anxiety post intervention. One possible explanation for this finding is that social anxiety is a less recognisable disorder relative to others among CYP. This is reflected in the baseline knowledge mean scores of the intervention and control groups (2.2; 1.8) compared to both conduct disorder (3.9; 3.5) and depression (4.7; 3.8) however eating disorders had a similar mean score (2.4; 2). Also, the percentage of CYP recognising social anxiety as a mental health problem (39.2%) was substantially lower than those recognising conduct disorder (86.3%), depression (76.9%) and eating disorders (53.6%).

Studies have varied in the help-seeking measures they utilise, some using measures of help-seeking attitudes and others using measures of help-seeking intentions. According to planned behaviour theory, help-seeking intentions may be more directly linked to actual help-seeking behaviour than other constructs (Ajzen, 1991, 2002; Fishbein & Ajzen, 1975). In addition, a stronger correlation has been found between intentions and actual behaviour than between attitudes and actual behaviour (Kim & Hunter, 1993).

The current study measured help-seeking awareness, which comprised of both help-seeking knowledge and intention questions. Help-seeking awareness did not improve following receipt of MindAid Youth for any of the four disorders. This is in contrast to face to face research showing improvements in intentions of helping a peer with mental health problems (Ojio et al., 2015). However, as mentioned above, this study had a number of methodological issues most saliently having a lack of a control group.

In addition, a face to face intervention is not directly comparable to a digital intervention. However, whilst the digital intervention was effective at improving mental health knowledge of a range of disorders, it raises the question of whether the intervention is sufficient to increase help-seeking awareness. Therefore, future studies would benefit from comparing the effectiveness of face to face versus digital MHL interventions in increasing help-seeking behaviour, utilising help-seeking measures and assessing intentions, given its association with actual help-seeking behaviour.

There were no significant differences found between groups on stigmatising attitudes. This finding is inconsistent with a previous RCT demonstrating that a face to face MHL intervention was successful in reducing the stigmatising attitudes of CYP (Milin et al., 2016). However, baseline stigma scores of the current study may have hit a ceiling effect with initial high mean scores of 65.7 and 67.9 for the intervention and control group, respectively, indicating that the CYP already had positive attitudes towards people with mental health difficulties prior to commencing the intervention. However, given the stigma measure is not validated, it could have lacked sensitivity to change.

Another possible reason for the finding is that the length of the MHL intervention was not sufficient to determine an effect; an increase in the duration of the intervention might reveal improved outcomes. Indeed, Milin et al's (2016) Curriculum Guide consisted of 6 distinct modules including a stigma of mental illness module. Whereas MindAid Youth consists of a range of mental health modules which touch on stigma but there is not a sole component addressing this area. This suggests that in addition to the duration of the intervention, the intervention itself may not have contained enough stigma education to see an effect.

Finally, students could have been subject to social desirability bias and scored higher on social attitudes. However, Livingston et al., (2013) similarly found no effect of their online social media campaign on stigmatising attitudes. Reporting that baseline levels of adolescent and young adults' stigma were already high. However, direct comparison between both studies is a challenge given that one was a 6-week digital intervention and the other was a 2 month long online campaign.

With the growth in technology, interventions are increasingly being delivered via the internet (Cuijpers, van Staten & Andersson, 2008). This has a number of advantages over traditional face to face methods some of which include being easily accessible, reaching a wider audience, being cost-effective, saving personal time and allowing the person to work at their own pace (Tennant et al., 2015; Marks et al., 2007). However, alongside these advantages of internet-based learning are potential drawbacks such as decreases in social connectedness, which has been shown to be important for effective learning (Rovai, 2002).

Given the lack of a significant finding for help-seeking awareness in the current study, a possible hypothesis is that non-interactional digital MHL interventions are effective at changing MHL knowledge but aren't substantive enough to effect behavioural and cognitive aspects such as help-seeking and stigmatising attitudes. It could be that a more interactional psychoeducational learning environment is required for that. To my knowledge there are no studies directly comparing the effectiveness of face to face and digital MHL interventions for CYP, and therefore future research would benefit from this evaluation.

The digital MHL intervention in the current study was designed to be used as a stand-alone app, reducing teacher burden and providing an accessible and cost-effective

intervention for CYP. However, teachers in the primary school provided some support and discussion alongside use of the app which changed its intended use. This begs the question whether a stand-alone digital intervention without support is realistic with younger children. Perhaps this format is more appropriately suited to secondary school children (as seen in the current project) where independent learning and the increasing use of technology in the classroom is more commonplace. However, an interactive component could be built into the app such as the use of an avatar to guide the young person through the modules, this might provide an alternative to teacher led support and maintain the apps intended use.

However, challenges are common when implementing and assessing effective interventions and programmes in real world settings (Rohrbach et al., 2006). Research suggests that whilst interventions and programmes are demonstrating positive outcomes when tested under 'ideal' conditions, there's little research investigating their 'transportability' to real world contexts such as school settings (Schoenwald & Hoagwood, 2001). Indeed, research of a variety of educational programmes shows that when interventions are translated into real-world settings, they're often modified to suit the context they're being implemented into (Ringwalt et al., 2003; Rogers, 2003; Botvin et al., 1990; Tappe, Galer-Unti, & Bailey, 1995).

1.2 Strengths

The study was the first of its kind: a mixed methods-controlled design to evaluate an online MHL intervention (MindAid Youth) in UK based school settings. The study benefitted from a large sample size of CYP recruited from both state and private school and therefore included a diverse range of participants from multi-cultural backgrounds

reflecting the ethnic make-up of the population (Department of Education, 2020). The use of a control group enabled the effects found to be associated with the intervention group itself and not unrelated extraneous variables.

All schools were instrumental in successfully implementing MindAid Youth alongside the students' national curriculum and within busy school environments. MindAid Youth was received well by all schools; children reported to having particularly enjoyed the interactive elements of the intervention, including the YouTube videos and the quizzes. One child in the intervention group at the end of post data collection reported, "now I know that worry is normal and that everyone feels it sometimes." Another student said, "I learnt that you shouldn't be worried about being friends with someone with a mental health problem."

Despite the time constraints of the study and limited funding 13 new mental health modules were developed and substantial graphic and interface improvements made to the app which enhanced the user experience. Furthermore, the intervention developed was found to be effective at improving MHL knowledge of a range of prevalent mental health disorders.

1.3 Limitations

There were several limitations in the current study. The first is the use of non-standardised outcome measures. Due to the lack of psychometrically sound measures for young people, studies are limited to developing study specific tools or adapting adult versions of measures (Hart et al., 2016). These are often inadequate as the language and content are not age appropriate and can result in substantial changes which render the measure ineffective from a standardised point of view (Wei et al.,

2015). In addition, as a result of the multiple ways that MHL can be and is measured across studies, the standardised measures do not always accurately reflect the interventions being implemented.

Another limitation of the measure was that they were self-report which increases social desirability bias. This is particularly relevant given that students completed measures in the same room and with the researchers present. However, to manage this students were spaced out, reassured that answers were confidential as noted by their unique ID codes on their questionnaires and encouraged to keep their work to themselves.

Whilst a strong sample size, another limitation of the study was missing data. One hundred and one students' data were removed due to incomplete data, sickness and COVID-19 related absence. Around 51 students had incomplete data on the final day of recruitment due to parents withdrawing their children from school two weeks prior to the Government recommendation of school closures. The study may also have been limited by sampling bias as schools were recruited through opportunistic sampling and schools may have been invested in the intervention being a successful outcome for children.

An RCT design could have been implemented which would have reduced the likelihood of bias in treatment assignment and managed the differences seen in baseline MHL levels observed in the current study. However, given the time constraints and lack of resources an RCT at this stage would not have been feasible. This instead might be more appropriate for a second stage of MindAid Youth evaluation when the intervention has been further refined.

Opt out consent is usual practice regarding curriculum delivery in the schools the research was carried out in. For example, in all schools the PSHE curriculum was mandatory unless the parents opted out. The current intervention was being provided in place of the standard PSHE lesson. Opt in consent is considered the gold standard for participant recruitment however it is time consuming, can limit participation (Krousel-Wood et al., 2006) and can cause bias in recruitment (Junhans et al., 2005). Opt out consent provides an alternative means of obtaining consent whereby the individual is required to take action to withdraw their consent. Opt out consent indicates a willingness rather than a refusal to participation and if the risks are very low for participants it is the most efficient procedure. This approach is likely to result in a more representative population (Cassell & Young, 2002).

Though schools provided informal feedback following participation in the study regarding the MHL intervention and measures, it would have been helpful for CYP to have played an active role at the design stage of the study. One school suggested that the outcome measure itself was too lengthy. This was corroborated by the researcher's observation that some students weren't able to complete the measure in their 45-minute standard teaching lesson resulting in some incomplete data. However, this could also be a reflection of the different learning and cognitive levels of some of the CYP within the classes rather than the length of measure. It was also noted that many CYP didn't know what a physiotherapist, social worker or what cognitive behavioural therapy was. Though it could be argued that the MHL intervention was aiming to provide teaching in these areas and low baseline knowledge would be reflective of low MHL levels. Nevertheless, these limitations point to the importance of future evaluations of MindAid Youth gathering opinions and feedback about the

content and usability of MindAid Youth and outcome measures from CYP through focus groups.

There is much contention and debate over the utility of psychiatric diagnostic categories in the literature. The uncritical adoption of psychiatry and the classification of mental health problems has been suggested to oversimplify human behaviour, run the risk of misdiagnosis and be reductionistic and stigmatising for individuals. However, diagnostic labels do provide a common language to communicate a set of symptoms between colleagues and are particularly useful when conducting research. (Pickersgill, 2014).

The concept of MHL and the literature surrounding it have been criticised for its psychiatric lens and overemphasis on psychiatric categories. As well as its mental illness narrative and being grounded in the medical paradigm (Pan & Zhou, 2013). The critiques whilst recognising the benefits it affords to responding to physical health problems believe its application is inadequate to human distress. They suggest that human distress is unique, cannot be fully understood as it is made sense of through language and interpretation (Ashfield, Macdonald & Smith, 2017). There is a concern that this reductionistic approach to human experience loses sight of the complex interplay of the mind, our emotions, behaviour and physical sensations alongside social and contextual influences. Ashfield, Macdonald, Abraham & Smith, (2017) argue that, 'to 'shoehorn' this dynamic experience into static psychopathological illness categories, is arguably both a departure from science and from good clinical practice.' (p.6). For example, these scholars suggest that a common human experience such as depression has been medicalised and pathologized. They have argued that our interpretation of depression is misleading and has been exaggerated

resulting in it being harmful and economically costly. They fear that depression has now become a 'diagnostic explanation applied to a broad range of human distress' where an illness diagnosis is not warranted (Raven, 2012).

Another argument against the concept of MHL and the illness narrative its embedded in is that due to the use of diagnostic criteria in clinical assessment and a bias in the biological explanation of depression the prescription of antidepressant drugs has increased and become common place (Raven, 2012). There is a fear that patients are being prescribed antidepressant medication alone which may provide some symptomatic relief. However, this is without consideration of alternative ways of tackling their condition such as self-help strategies and life-style changes which could be equally if not more beneficial (Strohle, 2009; Wu et al., 2016; Fernandez-Mendoza & Vgontzas, 2013). However, a core component of the MHL definition whilst recommending the use of medication for some mental health conditions also encourages the use of self-help strategies. It does not unilaterally suggest the prescription of medication but encourages individuals to develop their knowledge and recognition of mental health problems, seek support and be informed about the best evidenced based treatments available. Many of which include lifestyles changes and common coping tools/strategies (Jorm et al., 1997;2012).

There is also a concern that MHL centres around individual psychopathology and its treatment. It is believed that this approach tends to ignore the importance of social and other contextual factors to contributing to the individual's distress. In these situations, broader issues may need to be tackled rather than an individual oriented approach (Ashfield, Macdonald, Abraham & Smith, 2017). However, MHL does not just propose

an individualistic approach to increasing individuals MHL. Particularly when considering children and young people it encourages them to engage in conversations about worries with trusted adults and to be guided by them in accessing support. In addition, evidenced based treatments such a systemic intervention is recommended. However, it is fair to say that the socio-political backgrounds of individuals and its influence on the development and maintenance of individuals mental health difficulties could be considered and incorporated more into MHL practice and teaching.

MHL has also be critiqued for its emphasis on illness recognition and illness symptoms. According to the authors, it is suggested that once a person has identified with having a particular mental health disorder that the simple next step is being referred to the appropriate mental health professional for support. MHL assumes timely and accessible support. However, support is not always available in a timely or appropriate manner and there are often long wait lists and service quality can vary between boroughs (Ashfield et al., 2017). There is evidence to suggest the above assertion however, there is also accumulating evidence showing that increasing individuals MHL can lead to increased help-seeking behaviour (Milin et al., 2016) and early recognition and treatment seeking has been found to be linked to improved outcomes (Jorm, Korten & Jacomb, 1997). The importance therefore is on ensuring the government and policy makers increase the provision of services on offer so when individuals do seek treatment, they are able to access adequate and timely support.

1.4 Future research

The study was successful in recruiting a high number of participants however the increased sample size in the intervention group compared to the control group could have limited the effects seen by the intervention. Future studies would benefit therefore from equivalent group sizes. Due to the time constraints of the study it lacked follow-up comparison to determine the continued effect of MindAid Youth. Now that it has been shown to be possible to conduct a controlled digital MHL intervention in UK school settings, future studies would benefit from conducting more rigorously controlled designs such as an RCT and assessing the longer-term effects of MindAid Youth utilising psychometrically sound instruments.

Due to the heterogeneity across studies, it is difficult to determine the specific components of interventions that led to positive MHL outcomes (Clarke, Kuosmanen & Barry, 2015). Neither the current study, nor those aforementioned within the paper, assessed change processes related to MHL interventions. Therefore, future research would benefit from determining the effective components of digital interventions and the ideal programme and session length to achieve positive outcomes.

In regard to outcome measures, the majority of studies vary in the number of vignettes and the scoring system used. In addition, the follow-up questions related to the vignettes are often changed to suit the audience and content of the specific interventions utilised. This results in difficulties drawing comparisons between studies as questions and scoring systems are vastly different. Future research would benefit from developing a consistent method of follow-up questions and scoring system.

To date there are few published, standardised, psychometrically sound instruments to measure MHL in CYP. Therefore, one of the most important next steps in MHL research is the development, evaluation and validation of tools addressing mental health knowledge specifically for CYP (Wei et al., 2016).

1.5 Clinical implications

The importance of CYP's mental health and well-being is paramount given the early age of onset of mental health difficulties (Kieling et al., 2011; Kessler et al., 2005) and the far-reaching impact it can have on CYP's future development (Merikangas et al., 2010; Kessler et al., 1995). Indeed, a primary focus of national polices is the importance of early promotion, prevention and intervention of mental health problems and as such improving the MHL of CYP (HM Government, 2017; World Health Organisation, 2010). Improved MHL of CYP has been shown to be related to improved help-seeking (Ojio et al., 2015).

The current study demonstrated that improvements in knowledge were found following a digital MHL intervention however having knowledge about mental health disorders did not seem to impact help-seeking awareness. In addition, stigmatising attitudes did not improve following the intervention and research suggests that attitudes are a major barrier to help-seeking (Yap, Wright & Jorm, 2011). Given the relationship between knowledge, stigma and help-seeking it'll be important to focus on developing an understanding of the effective ingredients in MHL interventions necessary in reducing stigmatising attitudes and encouraging CYP accessing early treatment.

Thus, suggesting the continued need for government initiatives to focus on the promotion and prevention of mental health difficulties in CYP.

As part of the governments initiative to increase CYP's mental health provision, schools have been incentivised to identify and train 'designated senior leads for mental health' in all schools and teach MHL training. This is with the aim of developing closer ties between child and adolescent mental health services and the education system (HM Government, 2017; NHS Long term plan, 2019). This relationship is crucial however, it could be that overwhelming reliance on schools to promote and prevent CYPs mental health and well-being may be too taxing on school resources. It could be that implementing family interventions to compliment school MHL interventions could be one way of reducing this burden and shifting the emphasis of responsibility to families as well. Further, mental health promotion at a national level has been utilised successfully in other counties such as Australia and could prove to be effective in the UK.

Due to the high level of unmet demand for mental health services for CYP there is an urgent need to find alternative solutions to reaching large numbers of CYP. Technology has been suggested as a way to support this gap in care provision by providing support in a less resource intensive and cost-effective way (Wilkins, Kelly-Dean & Kail, 2019). The current study demonstrated that CYP receiving a digital MHL intervention showed improvements in their knowledge of mental health problems (conduct disorder, depression and eating disorders) compared to a control group. However, it was not successful in improving help-seeking awareness or stigma of mental health. Research in this area is underfunded and as a result there are few

studies evaluating digital MHL interventions for CYP (NHS Digital, 2017). Thus, in order to deliver effective digital MHL interventions more quality research is needed to investigate what aspects of digital delivery are most effective for whom and which components of MHL (Hill et al., 2017).

1.6 Conclusion

The study aimed to determine whether MindAid Youth an online application was effective in improving MHL related to disorder specific knowledge and help-seeking awareness. It also aimed to determine whether the intervention was successful in improving stigmatising attitudes around mental health problems. The delivery of the intervention in an online digital format was intended to provide schools with a more accessible and cost-effective format.

The study demonstrated that MindAid Youth was effective in improving young peoples' knowledge of conduct disorder, knowledge of depression and eating disorders compared to a control group. However, the intervention was not successful in improving young peoples' help-seeking awareness across disorders (conduct disorder, depression, social anxiety and eating disorders). The study did not show that the intervention was effective in reducing either knowledge or help-seeking awareness for social anxiety nor was it effective in reducing stigmatising attitudes of mental health problems. The null findings could be due to the fact that both groups already had high stigma scores at pre-testing and the duration of the intervention was not sufficient to raise scores further.

Part IV: Integration, Impact and Dissemination Plan

1. Integration

The current research aimed to determine whether a digital MHL intervention was effective at improving CYP's MHL in a school setting. The current study also aimed to evaluate systematically the effectiveness of MHL interventions for students at risk of developing EDs. These aims were accomplished through a systematic review and empirical study of the area.

The topic area of early promotion and prevention is a subject area close to my heart having had family members experience mental health difficulties during their youth. I've seen first-hand the benefits that providing early support can have for individuals and their families. I jumped at the opportunity to be involved in the project and develop it in an area that was important to me; children and young peoples' mental health. The project enabled me to be involved in the development of an intervention and develop my skills in outcome research and methodology.

Many children who develop mental health difficulties do not access treatment, and left unchecked or untreated, this increases the risk of developing difficulties associated with family, education and learning, physical health and offending behaviour (Department of Health, 2015). Providing CYP with the skills to recognise the signs and symptoms of mental health problems, who to seek support from and how and where

to access appropriate treatment, provides them with invaluable skills to develop their MHL and access timely treatment (Jorm et al., 1997). Evidence to which suggests that early intervention leads to better longer-term outcomes (Jorm, Korten & Jacomb, 1997).

My project expanded on a previous trainee's study which investigated teachers MHL through the use of a digital MHL intervention, MindAid. In 2016 a pilot study of MindAid was conducted to ascertain the efficacy and usability of the app for teachers. Nine teachers participated in a focus group and provided qualitative feedback about the strengths and weaknesses of MindAid including suggestions for its improvement. Some of these changes were made to MindAid and following this the efficacy of MindAid was evaluated with secondary school teachers. My study aimed to add a novel component to the app, developing the content and user interface to make it accessible to CYP.

I had wanted my review to link theoretically and conceptually with my empirical paper. However, MHL is a rapidly developing and expanding field which made finding a focus for the systematic review challenging. The initial intention was to conduct a review on the effectiveness of digital MHL interventions with CYP in the school population, however, a systematic review in the area had only recently been published (Tay, Tay, Klainin-Yobas, 2018).

Following this, I decided upon updating a previous systematic review (Wei, Kutcher, Zygmunt & McGrath, 2013), evaluating face to face MHL interventions in the school setting given that in the intervening years a plethora of additional studies had been

conducted. But upon searching PROSPERO, a study which had begun its search in June 2018 was found with the same aims. It was therefore necessary to widen the scope to other related areas.

EDs felt like a natural progression given the growing interest in supporting CYP's mental health, the high incidence of EDs in CYP and its connection to my empirical paper. However, following a priori search too few studies were found with CYP to justify a review. Instead my research revealed that EDs were more highly prevalent in the student population with an estimated prevalence of between 8% and 17% (Hoerr et al., 2002; Eisenberg et al., 2011; Varela-Mato et al., 2012) compared to the general public (Eisenberg et al., 2011). It was therefore agreed with my supervisor that there was a gap in the literature regarding the effectiveness of ED related MHL interventions for students at risk of developing EDs.

Given that the research in the area is at a fairly early stage of development, the review needed to include all designs and be flexible with its inclusion criteria. Due to the heterogeneity of the included studies in terms of interventions, design, and outcome measures this prevented a meta-analysis from being conducted.

Given the high prevalence of EDs in CYP attests to the need for more effective ED-MHL interventions at an earlier stage to target CYP. Interventions which intervene at a primary and secondary school level would potentially provide a buffer for those entering adolescence and stepping into further education and prevent the development of long-standing EDs. This could result in ED-MHL interventions not being a necessity in early adulthood if already targeted and effective in the early years.

It is of note that the empirical study included EDs in a way that few previous MHL intervention studies have with CYP. The majority of studies have tended to focus on disorders such as depression, anxiety, conduct disorder, psychosis and schizophrenia. Whereas the high prevalence of EDs in CYP suggests that this area warrants increased attention.

1.1 Consistencies between the review and empirical paper

The systematic review identified that overall ED-MHL interventions were effective at improving recognition of EDs. These findings were in line with the empirical study which found improvements in CYP's MHL knowledge (which incorporated recognition, identification of mental health disorders, symptomology and causes) of conduct disorder, depression and eating disorders.

There were a number of common methodological limitations throughout the literature relating to both the systematic review and empirical study:

- the systematic review highlighted the variety of measures used within and across studies which lacked reliability and validity;
- the empirical study similarly utilised measures which had not been standardised with this population, therefore adding to the heterogeneity in the literature.

In addition, the term MHL has been defined in multiple ways, leading to studies evaluating different components of MHL (Spiker & Hammer, 2018; Wei et al., 2015). This has meant studies are often not comparable due to the multiple definitions and

measures being used. As a result, these inconsistencies create barriers to conceptualising, understanding and measuring MHL (Macket et al., 2015).

Further, the multiple definitions of MHL along with the lack of agreement on its definition runs the risk of violating the principles of good construct definition (Spiker & Hammer, 2018). Thus, the aim for researchers should be to agree on a unified definition of MHL which captures its core components and leads to its consistent measurement.

Future research should also work on the standardisation of measures to assess CYP as many are lacking this or studies do not report their psychometric properties (O'Connor et al., 2014; Wei, 2017). This would increase the comparability across studies and provide a more robust evidence base for the effectiveness of MHL interventions.

'Health literacy' is a well-established concept and refers to an individual's ability to use health information to promote and maintain good physical health (Nutbeam, Wise, Bauman, Harris & Leeder, 1993; World Health Organisation (WHO), 2013). It has gained particular interest as it is related to significant improvements in health outcomes for both the individual and the population (Kutcher, Wei & Conoglio, 2016). The WHO has proposed that health literacy is a central aspect of the social determinants of health, outlining that it is, 'a stronger predictor of an individual's health status than income, employment status, education and racial or ethnic group.' (WHO, 2013, p.7). MHL arose from the health literacy literature with Jorm and colleagues

(1997) arguing that health literacy did not adequately address how individuals can achieve good mental health.

There is much debate in the field as to whether physical health models should be applied to our understanding of mental health. Proponents of this debate argue that there are a number of problems with medicalisation and psychiatric diagnosis. One of which is that there are important differences between psychiatric and medical diagnosis. Psychiatric diagnosis is based entirely on symptoms, in other words, complaints which are subjective to the person themselves or others such as feeling low in mood, difficulties concentrating etc. Whereas in medical diagnosis a key aspect is not simply relying on subjective symptoms to identify clusters but being able to identify 'signs,' - objective bodily characteristics or processes which can be observed or measured and may be related to these complaints and thought to be causing them (Johnstone & Boyle, 2018). However, it is argued that the DSM and ICD do not refer to these clusters in signs and symptoms as in medical research (Boyle, 2002a). Thus, it is suggested that these lists of symptoms are unlikely to represent valid patterns or lead to accurate psychiatric diagnosis.

Another difference between psychiatric and medical diagnosis is that as psychiatric diagnosis is based on individuals' subjective complaints it means that in devising diagnostic criteria clinicians have had to rely on subjective judgements and social norms. For example, it is suggested that criteria such as, 'irritable mood,' 'unusual perceptual experiences,' or 'inappropriate affect' are subjective and rely on social judgements about expectations of how people should behave or feel in certain situations. Whilst social judgements do also happen in medicine this diagnostic system

with some social elements can be validated independently whereas this is not possible for psychiatric diagnosis (Johnstone & Boyle, 2018).

Another reason proposed for why medical diagnosis shouldn't be applied to psychiatric diagnosis is that it is difficult to determine the validity and usefulness of them. For instance, individuals with the same diagnosis may share little in common and those with vastly different diagnoses may share many characteristics with little indication of whether these similarities and differences are meaningful or not. In addition, comorbidities are commonplace with many people meeting criteria for generalised anxiety disorder also having a comorbid mood disorder (Brown & Barlow, 2009). Furthermore, peoples own reported symptoms do not always follow the 'patterns' set out in the DSM and there is little evidence that DSM diagnoses predict the best treatment options. Thus, it has been argued that diagnostic categories have failed to find groups that share similar characteristics, to improve our understanding of the aetiology of certain problems and indicate which treatments are most effective for which disorders.

It is argued that the over medicalisation and application of psychiatric diagnosis to mental health problems limits our understanding of the impact and interaction between social, psychological and biological factors in producing and maintaining distress. In addition, diagnosis locates the problems in the individual rather than attributing the causes to the wider societal influences that may be present. An alternative perspective of viewing people's distress is not as a symptom of a mental health problem but rather as a meaningful response to difficult life experiences. For many people symptoms

classed as maladaptive serve as helpful strategies for reducing or managing distress and surviving adversity (Johnstone & Boyle, 2018).

The gold standard definition of MHL termed by Jorm and colleagues refers to the 'knowledge and beliefs about mental disorders, which aid their recognition, management or prevention' (Jorm et al., 1997, p. 182). These authors further refined/expanded the definition and suggested it included seven components which include: being able to recognise mental health problems, having knowledge of risk factors and causes, seeking information about mental health problems, drawing on self-help strategies, knowing who to access professional help from, engaging in appropriate help-seeking behaviour and attitudes that promote recognition (Jorm et al., 1997). However, there is a lack of consensus in the field about how MHL should be defined and measured (Spiker & Hammer, 2018; Kutcher, Wei & Coniglio, 2016; Wei, McGrath, Hayden & Kutcher, 2016) particularly given the extant research on each MHL concept (Wei, 2017).

In addition, it has been argued that the excessive expansion of a construct such as MHL can lead to construct stretching whereby a definition is too broad with undefined boundaries. This can then result in potential challenges when trying to measure that construct (Spiker & Hammer, 2018). Instead Spiker and Hammer (2018) suggest conceptualising MHL as a theory instead of a construct. This they believe would allow the incorporation of a number of salient concepts alongside avoiding the problems associated with the expansion of MHL construct. However, the lack of clarity in the literature continues and researchers should at the very least work to agree on a unified

definition of MHL encompassing its core components and resulting in its consistent measurement.

MHL research has established that having knowledge and recognition of mental health symptoms can improve help-seeking behaviours (Mason, Hart, Rossetto & Jorm 2015; Ojio et al., 2015; Milin et al., 2016) and stigmatising attitudes towards individuals with mental health problems (Milin et al., 2016). Furthermore, improvements in mental health knowledge have been found to significantly predict reductions in young people's stigmatising attitudes towards people with mental health difficulties (Milin et al., 2016 p.85).

Studies have used a variety of help-seeking measures including assessing help-seeking attitudes and other measures of help-seeking intentions. According to planned behaviour theory, help-seeking intentions may be more directly linked to actual help-seeking behaviour than other constructs (Ajzen, 1991, 2002; Fishbein & Ajzen, 1975). In addition, Kim and Hunter (1993) found there to be a stronger correlation between help-seeking intentions and actual behaviour than between help-seeking attitudes and actual behaviour.

The systematic review measured both help-seeking knowledge and intentions and the empirical paper measured help-seeking awareness which comprised of both help-seeking knowledge and intention questions. However, none of the studies included measured its association with actual help-seeking behaviour therefore the conclusions that may be drawn are limited. In addition to there being a lack of studies assessing help-seeking behaviour only one study in the review demonstrated improvements in

help-seeking knowledge. Further, the heterogeneity between outcome measures across studies makes it difficult to conclude that these interventions were effective in causing change in behaviour. Future studies would benefit from conducting more methodologically robust studies with comparable measures such as those assessing help-seeking intentions.

Stigma is a common barrier to CYP accessing treatment (Clement et al., 2015; Yap, Wright & Yorm, 2011). It is very hard to develop public health initiatives to address mental health stigma as these stigmatised attitudes are held not only by individuals but in the educational and family systems and broader societal structures. This is where MindAid Youth offers the opportunity to intervene. However, it may be that an online intervention aimed at young people in its current form could not realistically address these entrenched stigmatising attitudes.

1.2 Recruitment to the empirical study

Recruitment to the empirical project was successful with five state and private schools recruited and a total of 432 participants, however this number dropped to 321 due to missing data and COVID-19. This was substantially more than needed to provide an 80% power of detecting a medium effect; a priori power analysis had determined a sample size of 111 was required (55.5 in each group).

Factors which supported recruitment included the Government (Department of Health, 2015) emphasising the role of schools in supporting CYP's mental health and

encouraging the implementation of MHL interventions within all schools by 2022/23. I utilised this opportunity by enquiring about the school's mental health strategy and outlining the benefits MindAid Youth could bring to their schools to support their students MHL learning. Mental health champions were also identified within each school which supported engagement and retention of participants.

I also believe that part of the success of recruitment was down to my ability to establish strong relationships with the schools I contacted. I focussed on the needs of the schools in relation to mental health as well as the aims of my research. I spent time thinking and planning how I would engage/approach schools, who I would contact and how I could encourage the prospective schools to invest in my project based on our shared needs.

I was flexible and responsive to feedback from recruited schools, adapting the intervention and methodology whilst maintaining the research's methodological rigour. The intervention was successfully received in all schools, resulting in one private school asking for MHL teacher training. They are also in the process of allocating further funding to the provision of MHL within their school.

Although I was successful in engaging a large number of schools in the research, in the future, I would consider the timing of recruitment. I would aim to contact schools at the beginning of the academic year which would likely increase the number of participating schools.

1.3 Outcome measures

One of the limitations of the study was the lack of valid and reliable measures used. However, careful consideration was made when deciding to use the mental health vignettes to assess knowledge and help-seeking awareness of CYP. In addition, they have been used extensively in the literature with CYP and student populations. But, have been criticised for the length of time it takes to complete them as well as there being inconsistent scoring of vignettes between different studies, each seemingly developing their own scoring system (Jorm et al., 1997). This was found to be the case in my study where it took a number of participants longer than anticipated to complete the measures and resulted in incomplete data collection. Therefore, any future studies utilising MindAid Youth would benefit from shortening the length of the measure perhaps utilising only 2 to 3 vignettes and standardising the follow up questions.

Stigmatising attitudes were assessed using the attitudes towards mental illness scale a non-standardised measure developed for a MHL intervention, The Curriculum Guide (Kutcher & Wei, 2014; McLuckie, Kutcher et al., 2013; Milin et al., 2016). Again, given the lack of psychometrically robust measures available for CYP this measure felt the most appropriate given it had been used successfully in several trials with the above authors.

Despite the great interest in MHL in CYP there are a lack of standardised and psychometrically sound instruments for this population (Wei, McGrath, Hayden & Kutcher, 2015). The majority of studies have relied on amending existing adult measures or developing study specific ones (Wei, 2017). This causes problems in

terms of heterogeneity across studies making it difficult to draw comparisons between them given the different components of MHL being measured (Wei et al., 2015).

There were a number of other areas that would have been interesting to investigate given further time, such as examining whether there were any differences in MHL levels between male and female participants following the intervention. Studies show that mental health problems are more common in boys (11%) than girls (8%) (Green, McGinnity et al., 2005).

Moreover, evaluating the impact of MHL interventions on ethnicity would have been informative. The same ONS survey found that 1 in 10 white children had a mental health problem compared to just under 1 in 10 black children and 3 in 100 Indian children (Green, McGinnity et al., 2005). If as other research suggests there are differences in MHL levels for gender and ethnicity considerations need to be made about whether whole school MHL interventions are effective and what the most appropriate way forward is. It may be that for diverse populations with different MHL requirements a more tailored, individualised approach could be warranted.

Finally, due to the time constraints of the study, follow-up measure were not utilised to assess the long-term impact of the intervention. Time permitting, these follow-up measures may have been able to determine an effect for help-seeking and stigma, as entrenched beliefs and stereotypes could be harder to shift than increasing knowledge, which the intervention was successful in accomplishing for 3 of the 4 disorders.

1.4 MindAid Youth

The project enabled me to develop and tailor an intervention, MindAid Youth which was successful in improving CYP's mental health knowledge across several disorders in a school setting. I had the opportunity to try and secure funding (albeit unsuccessfully) and this led to having to make some difficult clinical decisions about the minimum viable product which might support change in MHL whilst also engaging young people. I worked in an interdisciplinary manner with students in the computer science department at Royal Holloway University of London to the develop the app. The process taught me a lot about app development and the common delays and challenges involved in getting an app to an acceptable end product. This slowed recruitment down with the first discussions with schools being held in September 2019 and final recruitment day being the first week of March 2020.

The key features of the app were:

- the 13 modules of mental health problems provided in bite size chunks outlining signs and symptoms of the disorder;
- how to access help; and
- suggested self-help coping tools.

In addition, the app has links to informative YouTube videos and quizzes. It is likely that the content of MindAid Youth needs to be adapted to be more coherent with the outcome measures and this may explain why for example help-seeking awareness did not improve following the intervention. There is a small section in each module outlining how to access help and who from, but this was not consistent between the

app and the measures. Whilst there are elements regarding stigma in the application there is no dedicated section related to stigma and this could explain the lack of a change seen in stigmatising attitudes.

The design of an application is an iterative process and given it was the first trial of its kind it is expected that tweaks and changes would be necessary. Future studies utilising MindAid Youth should incorporate the above suggestions in order to improve the application and determine whether MindAid Youth is an effective tool in improving help-seeking awareness and reducing stigma in CYP. Continued evaluations of its effectiveness should be carried out as digital innovations seem to be far exceeding the evaluation of them (Hill et al., 2017).

2. Impact

2.1 Improving MHL of CYP

Evidence shows that childhood is a critical period for the development of mental health problems (ONS, 2016). This developmental period sees CYP undergoing changes in their social, emotional and cognitive lives (Keble-Devlin, 2012). It is therefore a prime opportunity to implement early promotion and prevention programmes, where intervening at an early stage has been shown to lead to improved mental health outcomes (Jorm, Korten & Jacomb, 1997).

The NHS Long Term Plan (2019) outlines the government's aim of increasing MHL in CYP and the Green paper (DOH, 2017) stipulates the government's push for schools

to take an active role in the implementation and teaching of MHL or MHFA as a part of the standard national curriculum. The school setting, as well as providing, academic teaching supports CYP's social and emotional development with schools increasing their involvement in these areas (Clarke & Barry 2015; Fortier, Lalonde, Venesoen, Legwegoh & Short, 2017). However, teachers are overburdened, and their time already taxed with the academic requirements of the curriculum (Vostanis, Humphrey et al., 2013). MindAid Youth provides a comprehensive, easily accessible, stand-alone digital app to support CYP to increase their MHL levels, which teachers can implement in designated lesson slots.

During the intervention, teachers enquired about developing their own MHL in order to inform and support the learning provided to their students. Some of the teachers revealed feeling worried about delivering mental health content to students with little prior knowledge of mental health, and how best to support CYP's mental health themselves. This is crucial information as it provides initial insight into some of the anxieties faced by teachers, and indeed professionals when thinking about implementing MHL interventions into schools.

Evidence to this effect comes from the Department for Education's 2016 Teacher Voice Survey, which showed variability in teachers' confidence in providing mental health support to students. For example, 57% of teachers felt they were able to identify symptoms of mental health problems in students, but 23% felt unable. Forty per cent felt able to teach those with mental health needs and 34% did not, whilst 55% knew how to access support for the student 22% did not (Smith, Tattserall, Rabiasz & Sims, 2018).

MindAid Youth increased teachers' awareness of the need to develop their own MHL in order to support their students and to feel confident in delivering such programmes. This is a positive outcome of the study and suggests that interventions targeting both students and teachers simultaneously or concurrently could be effective in increasing teacher confidence and improving MHL for all. In order to accomplish a whole school approach, it relies on senior leadership to embed well-being into their provision and culture and provide dedicated time in the curriculum for mental health and well-being (HOC & HOE, 2017).

It has been a rewarding process conducting the study, and observing schools implement MindAid Youth into their classrooms, and witnessing the commitment teachers have to providing mental health care to CYP. As aforementioned, the schools demonstrated a significant amount of commitment to MindAid Youth, having initially been influenced by government guidance to support MHL. However, the most common difficulty observed for teachers was finding the time to implement the intervention within the already busy school day. Indeed, at least 4 additional schools were unable to participle because they had either already devised the PSHE timetable for the coming academic year or timetabling would not allow for implementation of the programme. This meant that for those schools which could participate, flexibility was necessary, and schools were given the choice to participate in the intervention or control arm of the study.

This points to the need for greater communication between policy makers, the Government and the Department of Education. In order to support the successful

implementation of MHL programmes across schools, teachers need to be guided by senior leadership on how they can incorporate MHL into the normal school curriculum. Whilst it is a core component of the Green paper (DOH, 2017), and an initiative set out to be completed by 2022/23 in reality it is more complex and challenging, and schools appear to be struggling to incorporate mental health teaching into an already over scheduled curriculum.

Those schools that participated as a control group all requested use of MindAid Youth following participation. Again, corroborating the above, participation as control for these schools was solely based on scheduling and timing with all schools feeling their young people would benefit from the programme. A sister school of one of the participating schools is a specialist learning school and showed a keen interest in participation. However, given the learning and cognitive difficulties in this group of young people participation was not possible. It does however point to a greater concern and need to provide early promotion and preventive support to those across the board in school settings not just those in mainstream schools. In fact, arguments could be made for a more urgent need for the implementation of early promotion and preventative measures for these young people given the additional difficulties they contend with.

Whilst teachers demonstrated a keen interest in developing their MHL levels, one primary school voiced their reservations about teaching certain mental health disorders such as EDs, citing concern that discussion itself would encourage the development of these symptoms. Evidence for the high prevalence of EDs in this population and age range did not seem to expel their fear or encourage the school to

participate in this module. However, it became apparent that parental views, and the pressure this creates upon decision making taken by teachers likely played a significant role as well as teachers own biased/entrenched views. This suggests the need for a community approach to mental health, where research is conducted in unison between students, teachers and primary caregivers. The value of such an intervention would have a far-reaching impact for the individual, society and services as a whole.

In addition, of note was the parents who did not consent their child to participate in the trial (n=22). Twelve of these students were from ethnically diverse backgrounds such as Arab, Indian and Chinese cultures. Research suggests that individuals from black and minority ethnic (BME) communities have more difficulty accessing mental health services than the majority of the population and tend to have poorer health outcomes (National Institute for Mental Health in England, 2003). Some of the most common barriers to accessing treatment here relate to stigma, (Knifton, Gervais et al., 2010) and a fear of being discriminated against (Suresh & Bhui, 2006). If we are to be successful in conducting preventative research with all CYP, in the community and at school careful consideration needs to be paid to how to respectfully engage diverse cultures with their own belief systems and principles around mental health. Interestingly, the teachers thought it was these children who would benefit the most from the intervention.

The intervention also provided a cost-effective alternative to face to face MHL interventions. The only challenges were finding enough computer space to facilitate each classes participation, and outcome measures were completed on paper rather

than online due to limited online access. With the government's prediction for all schools be teaching MHL as part of the national school curriculum by 2022/23, the allocation of extra funding to enable greater resources to achieve this aim is desperately needed.

2.2 Service-user feedback and involvement

The empirical study did engage a group of teachers to steer the development of MindAid Youth and shape the study design and choice of outcome measures prior to implementation of the intervention at schools. This forum was invaluable, and lead to fundamental changes in the language and content of the demographic information sheet and outcome measures, as well as significant changes in content and interface of MindAid Youth. For example, at the teacher's suggestion, changes were made to the font and background colour of the application to facilitate easier reading for students, particularly those with dyslexia.

However, the study could have been further supported and benefited by forming a CYP's advisory group and subsequent focus group to provide suggestions and feedback about design elements of the research project both prior and following intervention implementation. Had this been accomplished prior to commencement of the project, some of the observed challenges might have been avoided. For example, focusing on a reduced number of mental health problems resulting in fewer vignettes to be completed. This would have reduced the time needed to complete the outcome measures and perhaps fewer incomplete data. Future research should ensure that service-user involvement is a key component of the study.

3. **Dissemination**

The empirical findings of the study will be presented by my internal supervisor (Professor Helen Pote) later in 2020 at the International Society for Research on Internet Interventions (ISRII) which promotes the scientific study of information and communication technologies targeting behavioural, psychosocial, health and mental health outcomes. Due to the current COVID-19 situation a PowerPoint presentation of my empirical study was recorded and made available to 1st and 2nd year trainee clinical psychologists at Royal Holloway, University of London in May 2020. I would also like to publish the systematic review and empirical paper in relevant journals such as, BMC Public Health, International Journal of Mental Health Systems or Journal of School Health.

As part of my Clinical Doctoral training programme I presented the findings of my study to my current clinical placement at Great Ormond Street Hospital (GOSH) and to the Psychological Medicines Department within GOSH. Two of the control group schools requested use of MindAid Youth. A telephone consultation was had discussing the key features of MindAid Youth and how other schools have successfully implemented the intervention within the normal curriculum. Updated outcome measures were provided so schools could measure potential change.

I will also be disseminating the research findings to the five schools which participated in the study. Each school will receive a summary of the research findings with baseline data relevant to each school, and a child friendly version will also be provided. The

summary will be emailed to the identified school leads for their dissemination to participants and families as they see appropriate.

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Appendix A: Eating Disorders Diagnostic Categories

Anorexia Nervosa DSM-V Criteria

A. Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. Significantly low weight is defined as a weight that is less than minimally normal or, for children and adolescents, less than minimally expected.

B. Intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain, even though at a significantly low weight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.

Specify whether:
Restricting type: During the last three months, the individual has not engaged in recurrent episodes of binge eating or purging behaviour (i.e. self-induced vomiting, or the misuse of laxatives, diuretics, or enemas). This subtype describes presentations in which weight loss is accomplished primarily through dieting, fasting and/or excessive exercise.
Binge-eating/purging type: During the last three months the individual has engaged in recurrent episodes of binge eating or purging behaviour (i.e. self-induced vomiting, or the misuse of laxatives, diuretics, or enemas).

Specify current severity:
Mild: BMI more than 17
Moderate: BMI 16- 16.99
Severe: BMI 15-15.99
Extreme: BMI less than 15

Bulimia Nervosa DSM-V Criteria

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both:
　　1. Eating in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances;
　　2. A sense of lack of control overeating during the episodes (e.g. a feeling that one cannot stop eating or control what or how much one is eating.

B. Recurrent inappropriate compensatory behaviours to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviours both occur, on average, at least once a week for 3 months.

D. Self-evaluation is unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of anorexia nervosa.

<u>Specify current severity:</u>

Mild: An average of 1-3 episodes of inappropriate compensatory behaviours per week.

Moderate: An average of 4-7 episodes of inappropriate compensatory behaviours per week.

Severe: An average of 8-13 episodes of inappropriate compensatory behaviours per week.

Extreme: An average of 14 or more episodes of inappropriate compensatory behaviours per week.

Appendix B: Outline of MindAid Youth Intervention

MindAid Youth is an easily accessible online training tool, providing children and young people at primary and secondary school with accurate and up to date information to improve their mental health literacy. MindAid Youth is comprised of four key functions:

1. The **TALK** section provides guidance to children and young people on how to talk about their worries, ask for help and listen and support friends. These are embodied in an acronym and below it are a list of conversation starters to access support for themselves or friends and a link to a video about mental health.
2. The **QUIZ** section provides a way for children to identify if their mental health concerns are serious. The results of the Quiz can be emailed to the child, parent or a teacher. The Quiz is called the 'Me and My School Questionnaire (MMSQ) (Patalay, Deighton, Fonagy, Vostanis & Wolpert, 2014) and is based on the Strengths and Difficulties Questionnaire (SDQ). The MMSQ consists of an emotional and behavioural sub-scale and following completion provides an indication of whether the young person has either emotional or behavioural difficulties. It's a recommended screening tool for children and young people in Great Britain (Green, McGinnity, Meltzer, Ford & Goodman, 2004).
3. The **LIBRARY** section is comprised of 13 modules providing information about different mental health issues in bite size amounts. This includes information about what the disorder is and common symptoms, getting help and coping tools. There are also links to informative YouTube videos and Quizzes.
4. The **HELP** section is GPS localised, providing you with details of local organisations that you can contact to get the appropriate advice or support needed.

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Appendix C: Example Initial Email to Schools

Dear Education colleague,

Some of you may remember that two years ago we supported the development of an online tool called **MindAid** which aims to help improve teachers' mental health literacy.

The same developers are now piloting an extension of this tool - called **MindAid Youth** – which aims to improve children and young people's (Years 6 and above) knowledge and skills about mental health.

We would like to support a Trainee Clinical Psychologist's doctoral research study which aims to evaluate its effectiveness, through helping her recruitment of school students.

The details are the study and what is involved for participating schools are below:

Summary of the study:
This study aims to evaluate the effectiveness of a free online tool called **MindAid Youth,** which is designed to improve young people's knowledge and skills about mental health. With these skills they can protect their own well-being and support their friends.

What is MindAid Youth?
MindAid Youth is an app developed for children and young people; it consists of the following:

There are four main tabs: *talk, quiz, library & help.*

TALK: tips on how to talk about your worries, how to ask for help and how to listen and support a friend in need.
QUIZ: a quiz that can help you find out if you might need some help with your concerns.
LIBRARY: providing information about different mental health problems in bite size amounts.
HELP: where you can get help from if needed.

The young person can navigate through the different modules in the library section, watch short YouTube videos related to each module and complete a series of quizzes for fun and consolidating learning.

Who are we recruiting
We're recruiting primary schools Year 6 and secondary schools Years 7- 10 (11-15-year olds)

What does it involve for the school?
To run the programme for 6 weeks would involve:

* Sophie Good facilitating a pre-testing session (lesson 1) involving the introduction of app to teachers and students and completion of baseline questionnaires which would take 10-15 minutes.
* 4 online training sessions (lessons 2-5)
* Sophie Good facilitating lesson 6 - follow-up questionnaires and presentation on coping strategies related to e.g. anxiety/ low mood/ sleep hygiene/ mindfulness/ emotion regulation etc or of a topic chosen by the school which you would find of value.
* The lessons will be approximately 45 mins in length and should be embedded within the standard school curriculum.
* A control group would run alongside the intervention arm with lessons 1 and 6 completing the same questionnaires and continuing with their normal lesson e.g. PSHE.
* Sophie will be contactable to ask follow-up questions re the app and if any difficulties should arise.
* If any difficulties were to arise through use of the app there will be a pre-planned protocol developed with schools about how to access help (e.g. SENCO, GP, CAMHS, other support services that the young person can access).

We are looking for interested schools to please contact Sophie Good (Trainee Clinical Psychologist) directly to express interest at:
Sophie.good.2017@live.rhul.ac.uk

Appendix D: Parental Information Sheet

Information Sheet
MindAid Youth Study

Your child has the opportunity to participate in a research study which aims to improve their mental health knowledge and skills. This online package is for every child at school not just those experiencing stress or mental health concerns.

The Aims of this research study
This study aims to evaluate the effectiveness of a free online tool called MindAid Youth, which is designed to improve young people's knowledge and skills about mental health. With these skills they can protect their own well-being and support their friends.

Why is this training tool important?
- One in nine young people have a diagnosable mental health condition and many more experience significant stress, especially during the teenage years.
- 50% of mental health difficulties develop before the age of 14 so it is important that young people can spot the early signs of mental health difficulties and deal with them effectively.
- Community and school interventions where everyone learns about mental health have been shown to improve early recognition of problems, enable young people to get the right help early on and reduce the stigma that sometimes surrounds mental health problems.

What is Mental Health Literacy?
Mental health literacy (MHL) is an individual's knowledge and skills regarding mental health. This includes being able to recognise different signs of distress, know how to talk to and support someone in distress and have an awareness of how to seek further help. It includes one's attitudes to mental health and addresses stigmatised beliefs.

What is MindAid Youth?
MindAid Youth is an easily accessible online training tool, providing children with accurate and up to date information to improve their mental health literacy. MindAid Youth is designed to be easy to use and is comprised of four functions:
1. **Talk** - providing guidance on how to talk about your worries, ask for help and listen and support friends.
2. **Quiz** – a quiz that can help you identify if mental health concerns are serious.
3. **Library** – providing information about different mental health issues in bite size amounts.
4. **Help** - which is GPS localised, providing you with details of local organisations that you can contact to get the appropriate advice or support needed.
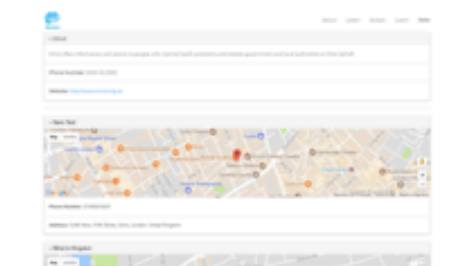
What will your child's participation involve?

If you decide you are happy for your child to take part, they will receive brief training on MindAid during school time from Sophie Good and Dr Helen Pote and be expected to complete some evaluation questionnaires. They will then have access to use MindAid Youth for three months. All children will complete the questionnaires again at the end of their three-month trial of MindAid Youth. A small group of children will also be asked for their feedback on how they found using the online tool and any suggestions for its improvement.

To help us test whether MindAid Youth really works some young people will wait 3 months before they begin the trail. This is so we can compare those young people using the training tool to those who are not. This means that you may consent and your child will complete a set questionnaires three months in advance of their MindAid Youth use and again just before they use it.

What happens to the information from the questionnaires?

The information your child provides is completely confidential and will not be shown to anyone but the researcher. All of your child's information will be stored under an ID number and in a secure filing cabinet. No information will ever be linked to their name. Copies of this anonymous information may be made available to other bodies for further secondary research, however the data will not be identified as yours.

What if I don't want my child to take part?

Please let the class teacher know using the slip below if YOU DO NOT want your child to take part. Your child does not have to take part in this study if he or she does not want to. If your child does decide to take part, they may withdraw at any time without having to give a reason. This decision will not affect them in anyway.

How do I find out more information?

This project is being completed by Sophie Good, Trainee Clinical Psychologist, Royal Holloway, University of London (Sophie.good.2017@live.rhul.ac.uk) and supervised by Dr Helen Pote, Royal Holloway University of London (h.pote@rhul.ac.uk) and Dr Anna Picciotto, Islington Community CAMHS.

Please keep this part of the sheet yourself for reference. Please feel free to ask any questions before you complete the consent attached. This study has been reviewed and approved by the College Ethics Committee at Royal Holloway, University of London.

....

Please tear off and hand to the class teacher if you do not want your child to participate in the study.

I do NOT want my child to take part in the above study.

Signature of parent: Date:

....

Appendix E: Child Information Sheet

MINDAID
Supporting your mental health

What is MindAid Youth?

- A website which can help in the early identification of common mental health problems and what can be done to manage them. It can also be used to support you or help you support your friends.

How does MindAid Youth work?

It has four functions that can be used:
TALK: tips on how to talk about your worries, how to ask for help and how to listen and support a friend in need.
QUIZ: a quiz that can help you find out if you might need some help with your concerns.
LIBRARY: providing information about different mental health problems in bite size amounts.
HELP: where you can get help from if needed.

Why is this work important?

- **1/10** young people have mental health problems. **50%** of these **develop before the age of 14.**
- These young people often experience increased disruption to their day to day life, including their mood, friendships, school and family life.
- **Early identification of problems can prevent them from escalating!**

What will using MindAid Youth involve?

- **Free mental health introduction** delivered by Sophie Good.
- **Use of MindAid Youth for three months** with the direct support of Sophie.

- We will also ask a small group of young people for **their feedback on how they found using MindAid Youth and any suggested improvements they have.**

What happens to the questionnaire I fill in?

- The information that you provide is **completely private** and will not be shown to anyone but the researcher.
- Your information will be **kept safe in a secure filing cabinet.**
- **No information will be linked to your name.**

The MindAid Youth Team

Sophie Good (Trainee Clinical Psychologist)
Sophie has 8 years of experience in working in mental health and is currently completing her Clinical Psychology Doctorate Training

Dr Helen Pote (Clinical Psychologist & Senior Lecturer, RHUL)
Helen has 20 years' experience working in t he NHS supporting young people, schools and teachers. Helen developed MindAid.
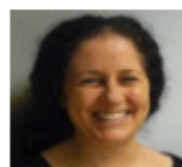
Dr Anna Picciotto (Consultant Clinical psychologist and Deputy Service lead of Islington Community CAMHS)

Appendix F: Demographic Questionnaire

Information About Me: MindAid Youth Study

You have been asked to participate in a study using an online application called MindAid Youth to examine how helpful it is. This is being carried out by Sophie Good, Trainee Clinical Psychologist.

Please fill in the questions below to the best of your ability.

1	How old are you?	MONTH: YEAR:
2	I am a Girl Boy	☐ ☐
3	Have you ever received support for anxiety, low mood or any other mental health difficulties?	Yes ☐ No ☐

4 If YES to the above question were any of the following terms used to describe your difficulties? (*Please circle*)

Anxiety   Family problems

Low mood   Problems at school

Behaviour problems or Anger   Eating problems

Other (*please specify*) ....

MindAid

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5 Has anyone in your family ever suffered from a mental health problem before?	Yes ☐ No ☐	
6 Do you have any friends who have suffered from a mental health problem?	Yes ☐ No ☐	

7 would describe my ethnic background as... (*please tick*)

White	Black or Black British	Asian or Asian British	Mixed
White British ☐	African ☐	Indian ☐	Mixed White & Black Caribbean ☐
White Irish ☐	Caribbean ☐	Pakistani ☐	Mixed White & Black African ☐
White Other ☐	Other Black ☐	Bangladeshi ☐	Mixed White & Asian ☐
		Chinese ☐	Mixed Other ☐
		Other Asian ☐	

Thank you for taking the time to complete this form.

Appendix G: The Vignette Questionnaire and Stigma Questionnaire

Vignettes

Please read through each of the four vignettes and answer the following questions which are based on the vignettes

Billy's Story

Billy is an eleven-year-old male living with his mum, dad and three sisters. He is in Year 6. He is often disobedient at home and school. He never seems to feel guilty after misbehaving. He frequently destroys his things, and steals, and has run away from home at least six times. He regularly gets into fights and seems to only hang around children who get into trouble. He has physically attacked others twice his size. Billy argues with everyone. He doesn't get along with his sisters or any of the children in the neighbourhood. He is mean and cheats whenever he plays with them. He's always swearing, having temper tantrums, and threatening people. Billy frequently destroys his sister's belongings. He also breaks articles of furniture in the home and other things that don't belong to him. He's mostly irritable and stubborn.

1. **Do you think Billy has a mental health problem?**

YES ☐   NO ☐   Don't know ☐

2. If you have answered YES to the above question, what name is given to this problem?

3.	Not at all confident	A little bit confident	Moderately confident	Quite a bit confident	Extremely confident
If Billy was a child you knew, how confident would you feel in helping him?					

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4. List 5 symptoms that Billy is displaying that makes you think he has the problem you have named	
i.	
ii.	
iii.	
Iv.	
v.	

5. Can you think of 3 reasons why Billy might be behaving like this?	
i.	
ii.	
iii.	

6. If you are worried about Billy, what could you do? (Select one or more options from the answers below)	
	Suggest Billy tell a health professional about his problems (e.g. a psychologist, counsellor, psychiatrist, social worker, GP).
	Talk to Billy and try to make friends with him
	Do nothing, his parents will help him
	Suggest to Billy he identify what helps him relax (e.g. listening to music, going for a walk)
	Tell Billy you have noticed something seems wrong and you want to make sure he is okay.
	Suggest Billy try to notice positive things that are going well in his life
	Suggest to Billy that he could try some relaxation exercises
	Let Billy know that everyone experiences these symptoms sometimes
	Suggest Billy tell a trusted adult about his problems (e.g. parent/caregiver or teacher.
	Tell Billy to 'snap out of it'

7. If Billy were to seek help, how helpful would you rate each of these options?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
GP or family doctor							
Mental Health Professional (e.g. psychologist, counsellor)							
Social worker							
School (eg. teacher, school counsellor)							
Religious Leader (e.g. Vicar, Priest,							

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Imam, Rabbi etc.)							
Billy tries to deal with his problems on his own							
Physiotherapist							

Of these 7 options, which <u>one</u> do you think will be the <u>most</u> helpful? *Please write your answer below*

8. How helpful do you think the following approaches would be for Billy?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful <u>or</u> Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
For school to support Billy							
Family therapy							
A Blood Test							
Cognitive behavioural therapy (CBT)							
Hypnosis							
Being admitted into hospital							
Billy's parents to provide some support							
A special diet of avoiding certain foods							

John's Story

John is a 12 year old who has been unusually sad and miserable for the last few weeks. He is tired all the time and has trouble sleeping at night. John doesn't feel like eating and has lost weight. He can't keep his mind on his studies and his marks have dropped. He puts off making any decisions and even day-to-day tasks seem too much for him. His parents and friends are very concerned about him. John says he will never be happy again and believes his family would be better off without him. John says he feels so desperate, he thinks he can't carry on.

1.Do you think John has a mental health problem

YES ☐   NO ☐   Don't know ☐

2. If you have answered YES to the above question, what name is given to this problem?

3.	Not at all confident	A little bit confident	Moderately confident	Quite a bit confident	Extremely confident
If John was a child you knew, how confident would you feel in helping him?					

4. List 5 symptoms that John is displaying that makes you think he has the problem you have named	
i.	
ii.	
iii.	
Iv.	
v.	

5. Can you think of 3 reasons why John might be behaving like this?	
i.	
ii.	
iii.	

6. If you are concerned about John, what could you do? (Select one or more options from the answers below)	
	Suggest John tell a health professional about his problems (e.g. a psychologist, counsellor, psychiatrist, social worker, GP).
	Talk to John and try to make friends with him
	Do nothing, it's not your responsibility
	Be kind to John, talk and listen to him about his problems
	Suggest John tell a trusted adult about his problems (e.g. parent/caregiver or teacher.
	Suggest to John that he could try some relaxation exercises
	Suggest to John to keep his activity levels up and to continue engaging in activities he finds enjoyable
	Tell John to 'snap out of it'
	Suggest John try to notice some of the positive things going on in his life
	Tell John you have noticed something seems wrong and you want to make sure he is okay.

7. If John were to seek help, how helpful would you rate each of these options?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
GP or family doctor							
Mental Health Professional (e.g. psychologist, counsellor)							
Social worker							
School (eg. teacher, school counsellor)							
Religious Leader (e.g. Vicar, Priest, Imam, Rabbi etc.)							
John tries to deal with his problems on his own							
Physiotherapy							
Of these 7 options, which one do you think will be the most helpful? *Please write your answer below*							

8. How helpful do you think the following approaches would be for John?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
Medication							
Physiotherapy							
Hypnosis							
Cognitive behavioural therapy (CBT)							
Family therapy							
Physical exercise							
A Blood Test							
A special diet of avoiding certain foods							

Jeanie's story

Jeanie is a 11 year old living at home with her parents. Jeanie started at your school last year and you are the only friend she has made so far. She seems very shy and when you ask her why she doesn't make more of an effort, she says she would really like to make more friends but is scared that she'll do or say something embarrassing when she's around others. Although Jeanie's schoolwork is OK she rarely says a word in class and becomes incredibly nervous, trembles, blushes and seems like she might vomit if she has to answer a question or speak in front of the class. At her house you have seen that Jeanie is quite talkative with her family but becomes quiet if anyone she doesn't know well comes over. She has stopped answering the phone and doesn't come to parties anymore. Jeanie says she knows her fears are unreasonable, but she can't seem to control them, and this really upsets her.

1.Do you think Jeanie has a mental health problem?

YES ☐   NO ☐   Don't know ☐

2. If you have answered YES to the above question, what name is given to this problem?

3.	Not at all confident	A little bit confident	Moderately confident	Quite a bit confident	Extremely confident
If Jeanie was a child you knew, how confident would you feel in helping her?					

4. List 5 symptoms that Jeanie is displaying that makes you think she has the problem you have named

i.	
ii.	
iii.	
Iv.	
v.	

5. Can you think of 3 reasons why Jeanie might be behaving like this?

i.	
ii.	
iii.	

6. If you are concerned about Jeanie, what could you do? (Select one or more options from the answers below)

	Suggest Jeanie tell a health professional about her problems (e.g. a psychologist, counsellor, psychiatrist, social worker, GP).
	Help Jeanie make other friends by introducing her to some of your friendship group
	Tell Jeanie to 'snap out of it'
	Do nothing, her parents will help her
	Do nothing, Jeanie will grow out of it
	Suggest to Jeanie that she could try some relaxation and breathing techniques
	Let Jeanie know that everyone feels worried sometimes
	Do nothing, it's not your responsibility
	Suggest to Jeanie that she talk to the school counsellor
	Listen to Jeanie talk about her problems

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7. If Jeanie were to seek help, how helpful would you rate each of these options?

	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
GP or family doctor							
Mental Health Professional (e.g. psychologist, counsellor)							
Social worker							
School (e.g. teacher, school counsellor)							
Religious Leader (e.g. Vicar, Priest, Imam, Rabbi etc.)							
Jeanie tries to deal with her problems on her own							
Physiotherapy							

Of these 7 options, which <u>one</u> do you think will be the <u>most</u> helpful? *Please write your answer below*

8. How helpful do you think the following approaches would be for Jeanie?

	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
Physiotherapy							
Hypnosis							
Admission to a mental health hospital							
Relaxation techniques							
Cognitive behavioural therapy (CBT)							

Family therapy						
A Blood Test						
Medication for a little while						

Simone's story

Simone is a 15 year old living at home with her parents. A few times a week, when she is feeling upset, she sneaks food into her bedroom, including biscuits and chocolate bars. She eats until uncomfortably full, then feels guilty about overeating. Although she feels disgusted with herself about the amount she can eat, she cannot seem to stop herself from eating. When she is finished, she hides the empty plates and wrappers under the bed or under piles of clothes on the floor. The next day she tells herself that she will exercise hard to make up for it, running and doing sit-ups until she is exhausted. Simone's mum has noticed that she has been doing this for at least half a year.

1. Do you think Simone has a mental health problem?

YES ☐   NO ☐   Don't know ☐

2. If you have answered YES to the above question, what name is given to this problem?

3.	Not at all confident	A little bit confident	Moderately confident	Quite a bit confident	Extremely confident
If Simone was a child you knew, how confident would you feel in helping her?					

4. List 5 symptoms that Simone is displaying that makes you think she has the problem you have named	
i.	
ii.	
iii.	
iv.	
v.	

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5. Can you think of 3 reasons why Simone might be behaving like this?	
i.	
ii.	
iii.	

6. If you are concerned about Simone, what could you do? (Select one or more options from the answers below)	
	Talk to Simone and try to make friends with her
	Tell Simone she needs to manage her diet better
	Do nothing, her parents will help her
	Listen to Simone talk about her problems
	Suggest Simone tell a health professional about her problems (e.g. a psychologist, counsellor, psychiatrist, social worker, GP)
	Suggest to Simone that she could try some relaxation exercises
	Suggest Simone tell a trusted adult about her problems (e.g. parent/caregiver or teacher
	Tell Simone's parents that you're worried about her
	Do nothing, it's not your responsibility
	Tell Simone you have noticed something seems wrong and you want to make sure she is okay.

7. If Simone were to seek help, how helpful would you rate each of these options?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
GP or family doctor							
Mental Health Professional (e.g. psychologist, counsellor)							
Social worker							
School (eg. teacher, school counsellor)							
Religious Leader (e.g. Vicar, Priest, Imam, Rabbi etc.)							
Simone tries to deal with her problems on her own							
Physiotherapy							
Of these 7 options, which one do you think will be the most helpful? *Please write your answer below*							

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8. How helpful do you think the following approaches would be for Simone?							
	Very helpful	Helpful	Somewhat Helpful	Neither Helpful or Unhelpful	Somewhat unhelpful	Unhelpful	Very unhelpful
Increasing the young person's understanding about the problem							
A Blood Test							
Relaxation techniques							
Physiotherapy							
Cognitive behavioural therapy (CBT)							
Family therapy							
Referral to a specialist mental health service for the particular problem							
Hypnosis							

Question	Strongly Disagree	Disagree	Disagree a little	Not sure	Agree a little	Agree	Strongly Agree
1. Most people with a mental health problem are too disabled to work							
2. People with mental health problems tend to bring it on themselves							
3. People with mental health problems don't try hard enough to get better							
4. Most violent crimes are committed by people with a mental health problem							

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5. You can't rely on people with a mental health problem						
6. I would be upset if someone with a mental health problem always sat next to me in class						
7. I would not be close friends with someone who had a mental health problem						
8. It is best to avoid someone with a mental health problem so that you don't develop this problem.						
9. I would not want to be taught by a teacher who had been treated for a mental health problem						
10. I would help a classmate if they got behind with their schoolwork because of a mental health problem						
11. I wouldn't mind if someone with a mental health problem lived next door to me						
12. I would avoid someone with a mental health problem						

Appendix H: MindAid Youth Presentation to the Intervention Group

What is mental health?

✓ Mental health is about our feelings, our thinking, our emotions and our moods.

✓ Everyone knows how to look after our physical health BUT looking after our mental health is just as important because you can't see it, you need to talk about it!
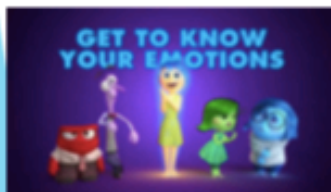
Why is mental health important?
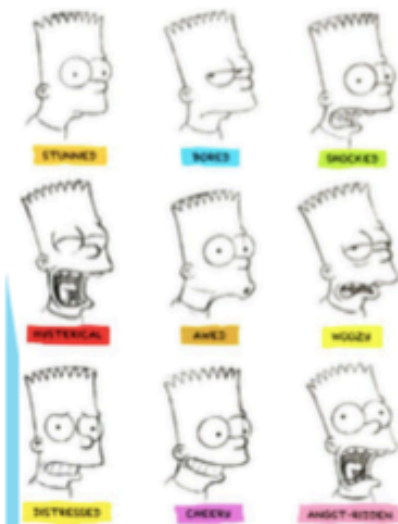
▶ We all have different feelings every day, they come, and they go.

▶ You can feel excited, silly, angry, nervous, grumpy, confused, lonely, happy, confident etc.

▶ These are small feelings that we all have everyday.

▶ Sometimes we can have BIG feelings and they don't go away.

▶ BIG feelings can affect our mental health. Big feelings can stop us getting on with our lives, they can change how we feel, how we behave, how we see the world and how we get on with other people.

What is MindAid Youth?

- MindAid Youth is a website which can help you learn about mental health,

- how to talk about it,

- who to talk to,

- and what can help.

- It can also be used to help you support your friends.

How to use MindAid Youth?

Open web browser and type in:
mindaid.org

The Home Page

YOUTH

TEACHER

Key Features of MindAid Youth

TALK

QUIZ

LIBRARY

HELP

Key Features of <u>MindAid Youth</u>

▶ **TALK**: tips on how to talk about your worries, how to ask for help and how to listen and support a friend in need.

▶ **QUIZ**: a quiz that can help you find out if you might need some help with your concerns.

▶ **LIBRARY**: providing information about different mental health problems in bite size amounts.

▶ **HELP**: where you can get help from if needed.

Talk

T	A	L	K
Tell others about how you are feeling, unless you open up to other people it is really hard for them to understand what you are going through and offer support.	**Ask** for help when you need it, don't be embarrassed or ashamed of your mental health, you deserve to feel better.	**Listen** to yourself, your thoughts and your body. Accept and don't ignore uncomfortable thoughts or feelings. Listen to others who are in distress.	Kindness and respect to others is important in developing communities which support wellbeing. Ask people how your friends are if you notice they are upset.

Quiz

Quiz results

Library

Click on the chosen topic

TALK
QUIZ
LIBRARY
HELP

Problems at School

Sleep Problems

Self-harm and Suicidal Behaviour

Loss and Grief

Flashback Trauma and Bullying

Eating Problems

Depression

Conduct Disorder

Autism Spectrum Condition

Anxiety

Library

Anxiety

Click to watch video on anxiety

Click to try the quiz

Read first then test yourself with this quiz!

What is it?

- Anxiety and worry are normal human feelings of fear. They usually appear when we're in situations that we find stressful.

- Most young people worry sometimes about things like friendships and exams. But afterwards they usually feel better.

- Common signs of anxiety are difficulties with sleep, difficulties concentrating, avoiding spending time with friends and spending more time alone. Anxiety can show itself as physical symptoms like tightness in the chest, breathlessness and feeling dizzy.

- Anxiety comes in many forms: Generalized anxiety with worries about many areas of life; Social anxiety about talking and mixing with other people; School anxiety and refusal to go to school and Panic Attacks, with breathlessness and fear of collapsing.

Getting help

- If you're feeling really anxious about something, it's important to let someone you trust like your parents or a teacher know about your fears. They can help you get support if needed.

- Some young people who have problems with anxiety may eventually be referred for therapies like Cognitive Behavioural Therapy. This is where you talk to a therapist who helps you understand your fearful thoughts and feelings and helps you use active techniques to challenge your worries.

Coping skills

Help

Help

Questionnaires

Questions

Appendix I: Royal Holloway University Ethics Application form

Ethics Review Details

You have chosen to submit your project to the REC for review.

Name:	Good, Sophie (2017)
Email:	NEJT019@live.rhul.ac.uk
Title of research project or grant:	Evaluating the effectiveness of an Online Mental Health Literacy Intervention for Children and Your People within a Secondary School Setting
Project type:	Royal Holloway postgraduate research project/grant
Department:	Psychology
Academic supervisor:	Dr Helen Pote
Email address of Academic Supervisor:	H.Pote@rhul.ac.uk
Funding Body Category:	No external funder
Funding Body:	
Start date:	06/05/2019
End date:	29/05/2020

Research question summary:

MHL incorporates knowledge, mental health skills and stigma and therefore the study specifically proposes the following:

1. Young people receiving an online MHL intervention will show improved MHL levels compared to a control group.

1a. Young people receiving an online MHL intervention will demonstrate increased mental health knowledge (recognition of mental health disorders and symptomology) compared to a control group.

1b. young people receiving an online MHL intervention will show improvements in mental health skills (help seeking and referral knowledge) compared to a control group.

1c. Young people receiving an online MHL intervention will have reduced stigmatising attitudes around mental health compared to a control group.

Research method summary:

This is a cluster control intervention trial and the sample will consist of class groups (11-18-year olds) across secondary schools. Parental consent will be obtained for young people under the age of 16 and above. Consent will be obtained on an opt out basis. Assent will be obtained from all young people.

The proposed research will utilise a waitlist quasi-experimental design, pre and post intervention. Baseline (1 week before intervention) and post intervention (at 6 weeks) data will be collected. Baseline data will include socio-demographic characteristics of the participant, history of MH problems in participant or family, and contact with people who have MH problems. Adolescent MHL will be assessed using the Mental Health Literacy Scale (MHLS), MH knowledge will be measured using the Mental Health Knowledge Schedule (MAKS). The Reported and Intended Behavioural Scale (RIBS) will measure stigma related behaviour and vignettes of young people with MH problems will measure recognition and identification of treatment of MH conditions.

The programme will run over 6-weeks and consist of a pre-testing session (lesson 1), 4 online training sessions (lessons 2-5) and post-testing session (lesson 6) all 45 minutes in length embedded within the standard curriculum during school hours. This ensures the 4 basic modules highlighted as the most common MH problems from epidemiological studies (anxiety, depression, eating and behavioural problems) are completed.

Young people will complete the online programme on a tablet provided by the school or desktop computer. To ensure fidelity a tick box determining if students have completed all 4 core modules will be included.

To evaluate the utility of MindAid and gather direct qualitative feedback on suggested improvements to the app from a user perspective a randomly selected sub-sample of 10 young people will be interviewed by the researcher.

Risks to participants

Does your research involve any of the below?
Children (under the age of 16),
Yes

Participants with cognitive or physical impairment that may render them unable to give informed consent,
No

Participants who may be vulnerable for personal, emotional, psychological or other reasons,
No

Participants who may become vulnerable as a result of the conduct of the study (e.g. because it raises sensitive issues) or as a result of what is revealed in the study (e.g. criminal behaviour, or behaviour which is culturally or socially questionable),
No

Participants in unequal power relations (e.g. groups that you teach or work with, in which participants may feel coerced or unable to withdraw),
No

Participants who are likely to suffer negative consequences if identified (e.g. professional censure, exposure to stigma or abuse, damage to professional or social standing),
No

Details,
It is very unlikely that distress will be provoked. Teachers will be on hand to discuss any issues with the young person. There will be in school resources by in school SENCO as appropriate (i.e. managed within usual school system of support).

opp to talk to teacher after wards

As recruitment is taking place within mainstream secondary schools' issues of capacity to consent are not expected. However, the proposed study asks participants at baseline to indicate in the demographic information sheets whether they or a family member or friend has/had a mental health problem. Where these questions provoke distress, a formalised procedure will be implemented to sign post the individual to the appropriate service. For those where immediate high risk is indicated, form tutors/ their teachers will provide appropriate guidance on presenting to emergency services.

Design and Data

Does your study include any of the following?

Will it be necessary for participants to take part in the study without their knowledge and/or informed consent at the time?,
No

Is there a risk that participants may be or become identifiable?,
No

Is pain or discomfort likely to result from the study?,
No

Could the study induce psychological stress or anxiety, or cause harm or negative consequences beyond the risks encountered in normal life?,
Yes

Does this research require approval from the NHS?,
No

If so what is the NHS Approval number,

Are drugs, placebos or other substances to be administered to the study participants, or will the study involve invasive, intrusive or potentially harmful procedures of any kind?,
No

Will human tissue including blood, saliva, urine, faeces, sperm or eggs be collected or used in the project?,
No

Will the research involve the use of administrative or secure data that requires permission from the appropriate authorities before use?,
No

Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?,
No

Is there a risk that any of the material, data, or outcomes to be used in this study has been derived from ethically-unsound procedures?,
No

Details,
N/A

Risks to the Environment / Society

Will the conduct of the research pose risks to the environment, site, society, or artifacts?,
No

Will the research be undertaken on private or government property without permission?,
No

Will geological or sedimentological samples be removed without permission?,
No

Will cultural or archaeological artifacts be removed without permission?,
No

Details,
N/A

Risks to Researchers/Institution

Does your research present any of the following risks to researchers or to the institution?

Is there a possibility that the researcher could be placed in a vulnerable situation either emotionally or physically (e.g. by being alone with vulnerable, or potentially aggressive participants, by entering an unsafe environment, or by working in countries in which there is unrest)?,
No

Is the topic of the research sensitive or controversial such that the researcher could be ethically or legally compromised (e.g. as a result of disclosures made during the research)?,
No

Will the research involve the investigation or observation of illegal practices, or the participation in illegal practices?,
No

Could any aspects of the research mean that the University has failed in its duty to care for researchers, participants, or the environment / society?,
No

Is there any reputational risk concerning the source of your funding?,
No

Is there any other ethical issue that may arise during the conduct of this study that could bring the institution into disrepute?,
No

Details,

N/A

Declaration

By submitting this form, I declare that the questions above have been answered truthfully and to the best of my knowledge and belief, and that I take full responsibility for these responses. I undertake to observe ethical principles throughout the research project and to report any changes that affect the ethics of the project to the University Research Ethics Committee for review.

Certificate produced for user ID, NEJT019

Date:	13/05/2020 11:05
Signed by:	Good, Sophie (2017)
Digital Signature:	
Certificate dated:	13/05/2020
Files uploaded:	Parental Consent Form V2 12.07.19.docx Parental Participant Information Sheet V2 12.07.19.docx Assent Form V1 12.07.19.docx Child friendly Study Invitation Sheet V2 12.07.19.docx

Appendix J: Royal Holloway University Ethical approval

From: Ethics Application System <ethics@rhul.ac.uk>
Sent: 09 September 2019 01:38
To: Good, Sophie (2017) <Sophie.Good.2017@live.rhul.ac.uk>; Pote, H <H.Pote@rhul.ac.uk>;
ethics@rhul.ac.uk <ethics@rhul.ac.uk>
Subject: Result of your application to the Research Ethics Committee (application ID 1640)

PI: Dr Helen Pote

Project title: Evaluating the effectiveness of an Online Mental Health Literacy
Intervention for Children and Your People within a School Setting

REC ProjectID: 1640

Your application has been approved by the Research Ethics Committee.
Please report any subsequent changes that affect the ethics of the project to the
University Research Ethics Committee ethics@rhul.ac.uk

From: Ethics <Ethics@rhul.ac.uk>
Sent: 05 November 2019 01:42
To: Good, Sophie (2017) <Sophie.Good.2017@live.rhul.ac.uk>
Subject: RE: Result of your application to the Research Ethics Committee (application ID 1640)

Good Morning Sophie,

I can confirm the amendment has been approved.

Kind Regards,

Leisha

Appendix K: Formalised Procedure for Managing Risk

Formalised procedure for managing potential distress

It is not expected that using the MindAid app should cause young people and children distress. However, in the event that it does, the formalised procedure in place is as follows:

- Each school will have a designated MindAid champion
- Children will be made aware during the initial training session and during the intervention session that should they become distressed by any of the information read that they can speak with the allocated champion.
- In addition, schools are well equipped with pastoral care to support children and young people should they become distressed. If after taking part in the study the young person should become distressed, they will be able to access these services. Again, this will be made clear during the initial training and subsequent sessions.