















Loneliness and mental health in children and adolescents with pre-existing mental health problems: A rapid systematic review

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Objectives. Periods of social isolation are associated with loneliness in children and young people, and loneliness is associated with poor mental and physical health. Children and young people with pre-existing mental health difficulties may be prone to loneliness. Containment of COVID-19 has necessitated widespread social isolation, with unprecedented school closures and restrictions imposed on social interactions. This rapid review aimed to establish what is known about the relationship between loneliness and mental health problems in children and young people with pre-existing mental health problems.

Methods. We sought to identify all primary research that examined the cross-sectional and longitudinal associations between loneliness/perceived social isolation and mental health in children and young people with pre-existing mental health problems. We also aimed to identify effective interventions that reduce the adverse impact of loneliness. A rapid systematic search was conducted using MEDLINE, PsycINFO, and Web of Science.

Results. Of 4,531 papers screened, 15 included children and young people with pre-existing mental health conditions. These 15 studies included 1,536 children and young people aged between 6 and 23 years with social phobia, anxiety and/or depression, and neurodevelopmental disorders. Loneliness was associated with anxiety and depression both cross-sectionally and prospectively in children and young people with mental health problems and neurodevelopmental conditions. We found preliminary evidence that psychological treatments can help to reduce feelings of loneliness in this population.

Conclusions. Loneliness is associated with depression and anxiety in children and young people with pre-existing mental health conditions, and this relationship may be

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bidirectional. Existing interventions to address loneliness and/or mental health difficulties in other contexts may be applied to this population, although they may need adaptation and testing in younger children and adolescents.

Practitioner points

- Loneliness is common in children and young people, and during periods of enforced social isolation such as during COVID-19, children and young people report high levels of loneliness (or increased rates of loneliness).
- The review showed that loneliness is associated, both cross-sectionally and prospectively, in children and young people with mental health problems and also in children and young people with neurodevelopmental conditions, such as autism spectrum disorder. Thus, loneliness is a possible risk factor of which mental health providers should be aware.
- Maintaining social contact both by direct and by indirect means, especially through the Internet, could be important in mitigating loneliness.
- Interventions to address loneliness should be further developed and tested to help children and young people with pre-existing mental health problems who are lonely by preventing exacerbation of their mental health difficulties, in particular anxiety and depression.

Loneliness is a common but not inevitable consequence of social isolation. Unsurprisingly, during the COVID-19 pandemic when many countries mandated social isolation as a means of reducing contagion, a high proportion of children and young people have reported feeling lonely (Mental Health Foundation, 2020). Loneliness is defined as the experience of a deficit between actual social relationships and desired social relationships, either in quality or in quantity (Perlman & Peplau, 1981). Social isolation in the broader sense refers to a lack of social contacts in terms of social network size, diversity, or frequency (de Jong, van Tilburg, & Dykstra, 2006). Although it is a negative experience, loneliness may have functional value by motivating reconnection with others and the strengthening of social relationships (Cacioppo & Hawkley, 2009; Qualter et al., 2015). However, when loneliness is chronic, that is, it is prolonged and intense, such as in a pandemic context, this may have adverse health effects (Eccles, Qualter, Madsen, & Holstein, 2020; Qualter et al., 2015). Loneliness is a common experience affecting all age groups, but is common in adolescence (Qualter et al., 2015). Up to 80% of children and young people describe being lonely at least sometimes (Berguno, Leroux, McAinsh & Shaikh, 2004), and between 3% (Vanhalst et al., 2013) and 22% report chronic loneliness.

Young people seem particularly prone to being lonely (Lasgaard, Friis, & Shevlin, 2016). This can be understood within the developmental context – adolescence is a key period when social interaction and peer relationships are of paramount importance to social identity and individuation from the family (Blakemore & Mills, 2014; La Greca & Prinstein, 1999). However, given that current disease containment measures have reduced social contact from outside the household, it is likely that this has increased experiences of loneliness for children and young people (Serafini et al., 2020). Loneliness in children and young people is associated with poorer physical health, sleep problems (Eccles et al., 2020; Matthews et al., 2017), and increased risk behaviours such as smoking, drug-taking, and alcohol in young people (Stickley, Koyanagi, Koposov, Schwab-Stone, & Ruchkin, 2014). Specifically, in the context of the COVID-19 pandemic, evidence from a range of countries including the United Kingdom, Spain, Belgium, and Italy has highlighted the association between increased loneliness and increased distress in

children and young people (Cooper et al., 2021; Marchini et al., 2021; Orgilés, Morales, Delveccio, Mazzeschi, & Espada, 2020).

Young people are also particularly vulnerable to developing mental health problems, with an estimated one in eight 5- to 19-year-olds having a mental health disorder (NHS Digital, 2018) and approximately 75% of all mental health problems emerging before age 24 (Kessler et al., 2007). However, little is known about the experiences of loneliness in children and young people with pre-existing mental health problems. There is consistent evidence of associations between loneliness and mental health problems in adults (Alasmawi et al., 2020; Ge, Yap, Ong, & Heng, 2017; Matthews et al., 2019; Wang, Mann, Lloyd-Evans, Ma, & Johnson, 2018). Furthermore, in adults the relationship between loneliness and mental health appears to be bidirectional (Nuyen et al., 2019). A systematic review found some evidence that loneliness is associated with worse mental health outcomes over time, including worse depression and anxiety symptoms and poorer remission of depression (Wang et al., 2018). There is less research into loneliness and mental health in children and young people (Pitman, Mann, & Johnson, 2018). More research is urgently needed given the evidence that young people seem particularly prone to both being lonely and developing mental health problems.

Young people are also likely to be particularly impacted by the current disease containment measures. For children and young people across the world, there have been extensive school closures. According to UNESCO, 1.5 billion students globally have experienced school closures. These closures are associated with significant harm to children and young people, including poorer mental and physical health, a reduction in child protection referrals, fewer self-harm and psychiatric attendances indicating an unmet mental health need, and a rise in suicide (Ford, John, & Gunnell, 2021; Viner et al., 2021; Waite et al., 2020). School closures together with social distancing measures are likely to result in an increase in loneliness. Specifically, since the UK lockdown significantly more young people aged 16–24 years have reported 'lockdown loneliness' (50.8%; i.e., feeling lonely during lockdown), compared with the general figure of the United Kingdom (30.9%; Office of National Statistics, 2020). Young people are also three times more likely to be lonely than before lockdown (Mental Health Foundation, 2020). It is therefore probable that loneliness will increase given current disease containment measures including lockdowns, stay-at-home regulations, and social distancing measures due to the COVID-19 pandemic (Bu, Steptoe, & Fancourt, 2020).

It is possible that children and young people with mental health problems will experience deterioration in their mental health during a pandemic for the following reasons: experience of trauma, lack of access to social support, and lack of access to treatment. In a UK survey of 2111 young people aged 13–25 years, 83% of those surveyed reported that the COVID-19 pandemic had made their mental health worse (YoungMinds, 2020). In addition, because of the closure of schools and curtailment of mental health services and peer support groups, 26% of those who were receiving support for their mental health prior to COVID-19 were unable to access support (YoungMinds, 2020). Young people also frequently reported that isolation and loss of social connections were common worries and impacted on their mental health. Other research has shown an increase in perceived stress and anger in young people during the COVID-19 pandemic compared with pre-pandemic (Shanahan et al., 2020). Importantly, the emotional distress experienced by young people pre-COVID-19 was the strongest predictor of emotional distress during COVID-19. However, protective factors such as maintaining physical activity, positive reappraisal, and maintaining a daily routine were associated with lower emotional distress in young people during COVID-19 (Shanahan et al., 2020), therefore

highlighting key targets that may reduce emotional distress in young people during the COVID-19 pandemic.

In the light of COVID-19 and the social distancing experienced by children and young people across the world, we performed a rapid review to examine the relationship between loneliness and mental health problems in children and young people. We found that loneliness was associated with and predicted subsequent mental health problems in healthy children and adolescents (Loades et al., 2020). Because those with mental health problems may be especially vulnerable to the effects of social distancing, including feelings of loneliness, it is important to review the evidence to identify what is known about the effects of loneliness on mental health in these at-risk populations and also what interventions have been used to target loneliness in this population.

Rapid reviews provide a timely evidence synthesis to inform urgent health care policy decision-making (Tricco, Langlois, & Straus, 2017). The Cochrane Rapid Reviews Methods Group define a rapid review as 'a form of knowledge synthesis that accelerates the process of conducting a traditional systematic review through streamlining or omitting specific methods to produce evidence for stakeholders in a resource-efficient manner' (Garritty et al., 2020, p. 1). A rapid review follows the principles of systematic reviews such as ensuring reproducibility, scientific rigour, and transparency (Tricco et al., 2017). However, to ensure a rapid review is produced quickly, shortened forms of the systematic review methodology are adopted. For example, search criteria are limited in relation to the time, database, or language, this enables data extraction to be faster and a narrative synthesis method is also used to summarize results (Ganann, Ciliska, & Thomas, 2010; Tricco et al., 2015).

Our specific review questions were as follows:

1. Is loneliness associated with mental health problems in children and young people with pre-existing mental health needs both cross-sectionally and prospectively?
2. What treatments/interventions are effective for improving the mental health of children and young people with mental health problems experiencing loneliness?

Method

Literature searches and inclusion criteria

Searches were conducted in March 2020 using MEDLINE, PsycINFO, and Web of Science. The search strategy was designed to capture (1) children or adolescents, (2) social isolation or loneliness, and (3) mental health problems, with a focus on anxiety and depression as the most common mental health problems in children and young people (see Appendix for search terms). An English-language limit was applied to Web of Science only. The first 50 references of Cochrane library were also hand-searched with adapted search terms.

Studies were selected based on predefined inclusion criteria: peer-reviewed publications (1946 or database inception to 29 March 2020), published in English, reporting on primary research, in a sample of predominantly children or adolescents (mean age < 21). We chose 21 as the mean age limit in accordance with the World Health Organization's definition of adolescence as ages 10 to 19, and young people as ages 10–24 (World Health Organization, 2019). To be included, studies had to recruit participants selected because of heightened distress (i.e., participants scored above a clinical cut-off based on a validated screening tool), mental health problems, or diagnoses based on internationally recognized

criteria, for example, DSM-5, ICD (APA, 2013; World Health Organisation, 2019), including autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD), and include a valid measure of loneliness or perceived social isolation at baseline. We also required the studies to use a validated measure (e.g., questionnaire/standardized assessment) of depression, anxiety, trauma, obsessive-compulsive disorder (OCD), mental health, or psychological well-being at baseline and/or follow-up. Cross-sectional, longitudinal observational studies and clinical trials were included. Qualitative studies, unpublished papers/theses, and conference abstracts were excluded. Papers where full texts could not be accessed after reasonable attempts were excluded due to time constraints of the rapid review.

Selection process and data collection

Papers identified through database searches were screened for duplicates (NH-S). Titles and abstracts were screened against inclusion/exclusion criteria, with 20% randomly double-screened to ensure accuracy (NH-S, AB, CL). The remaining papers were then full-text-screened (NH-S, CL), with another 20% randomly double-screened (MM). Discrepancies during both screenings were resolved through discussions with the senior author (ML). Data of included studies were then extracted into a database designed to capture the date of the study, details of study setting and design, sample characteristics, measure or description of social isolation or loneliness, measure of mental health, main findings, key limitations, and details of intervention/treatment (ML, EC, AB, CL). A random 20% of the data was double-entered to check for accuracy (ML).

Analysis strategy: Data synthesis

A narrative synthesis, which summarized the results of included studies, was conducted.

Quality assessment

Quality assessment was conducted by one author (TS) using the relevant study quality assessment tool published by the NIH (2020). Studies were evaluated on specific criteria pertaining to the design used. Example items included in the criteria refer to whether or not the eligibility criteria for included and excluded studies were predefined or specified and whether or not the literature search was comprehensive and systematic, etc. Where a study contained elements of more than one study design (e.g., elements of both cross-sectional and case-control study design), we selected a single checklist that most thoroughly evaluated the study's predominant methodology. Each study was given an overall assessment of quality, as 'poor', 'fair', or 'good', as per guidance from the NIH. Where relevant, associated or preceding studies were also assessed to facilitate a robust understanding of the study methods used.

Results

Our initial search identified 4,531 papers (Figure 1). Sixty-five papers that focused on samples of unselected children and adolescents from the general population were reviewed elsewhere (Loades et al., 2020) and are not considered here. These 65 papers were not included in the current review because they did not meet the criterion of

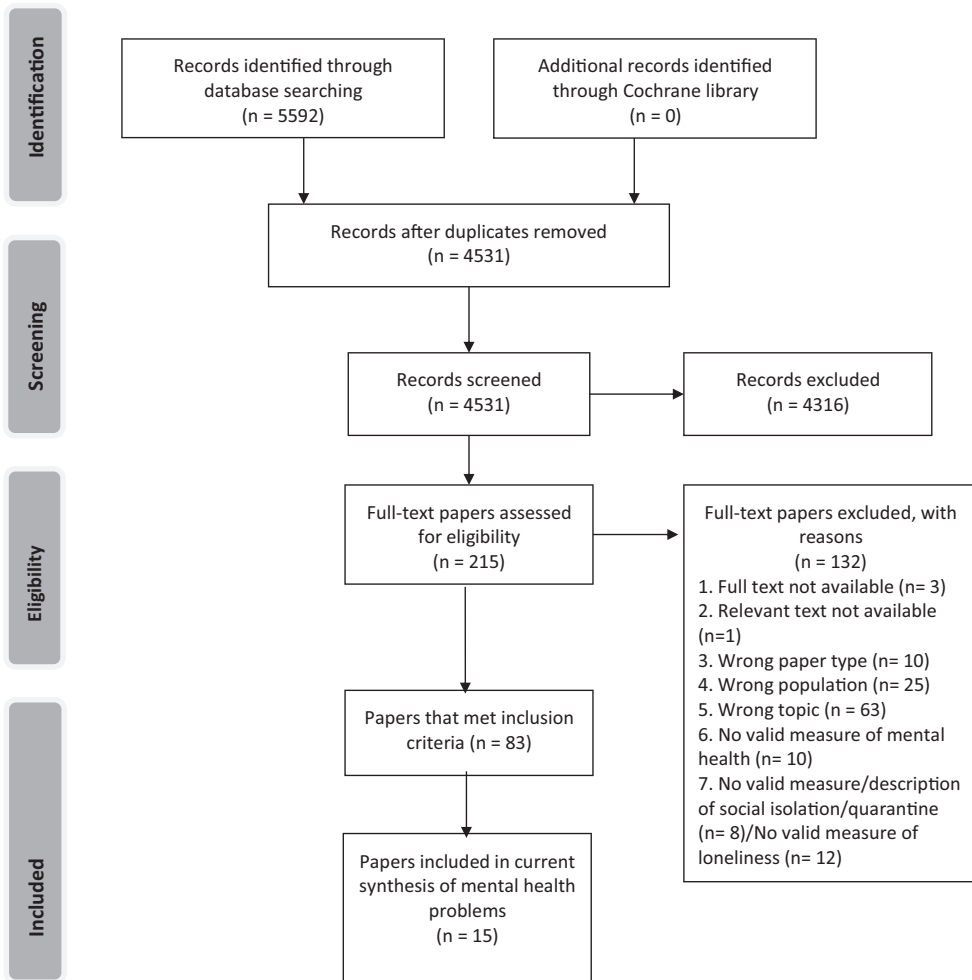


Figure 1. PRISMA diagram.

participants having a mental health diagnosis or a neurodevelopmental diagnosis on internationally recognized criteria (DSM or ICD) or classified as having a probable mental health problem based on a validated screening tool.

Fifteen papers (Table 1) measured loneliness and mental health in samples with elevated symptoms of mental health problems such as depression and anxiety and/or diagnosed mental health problems (12 studies) and neurodevelopmental conditions (three studies).

Summary of studies and quality assessment

The 15 included studies were conducted in the United States ($N = 9$) with the remainder taking place in Australia ($N = 3$), Canada ($N = 1$), China ($N = 1$), and Taiwan ($N = 1$). Most of the studies used a cross-sectional design ($N = 12$), and 10 studies used a case-control design. Five studies reported longitudinal follow-up of cohorts. One longitudinal study was observational. The remaining four longitudinal studies included an

Table 1. Summary of studies and key findings

Author (year), country	Sample		Comparison group		Loneliness measure	Mental Health Measure(s) – self-reported unless stated	Association and between and group differences		Longitudinal results
	Condition (recruitment)	Total N (% males)	Age range at baseline (years)	Mean age (SD)			Lon – loneliness	Anx – anxiety	
Mental health problems Ammerman et al. (1993), USA	Psychiatric inpatients (clinical sample)	109 (82)	6–12	9.89 (1.76)	LS	CMAS-R, CDI, CBCL (parent), TRF (teacher)	Clinical sample: Lon-Dep, $r = .66$ $p < .001$. Lon-Anx, n.s.	N/A	N/A
	Social phobia (media adverts)	106 (52.4)	13–16	14.3 (1.07)	LS	SPAI-C, CDI, CBCL (parent), TRF (teacher)	Social phobia group significantly higher Lon Partial $\eta^2 = .426$, ($p < .001$).	N/A	N/A
	Social phobia (clinic referred)	50 (44%)	7–13	10.1 (n.s.)	LS	SPAI-C, CDI, CBCL (parent)	Social phobia group Lon in clinical range. Social phobia group significantly higher on Lon than norms. $t_{49} = 6.76$, $p < .0005$	N/A	N/A
Ebesutani and et al. (2015), USA	Psychiatric inpatients	254 (49)	Approx 7–19	n.s.	LS	RCADS	Clinical sample: Lon-Anx, $r = .35$, Lon-depr, $r = .35$. Comparison sample: Lon-Anx, $r = .34$, Lon-Dep, $r = .39$. Lon was a significant mediator of the relationship between Anx and Dep.	N/A	N/A
Erath et al., 2010 (2010), USA	Social phobia (school students screened)	383 (43)	11–14	12.67 (n.s.)	None	SAS-A	Lon-social Anx, $r = .53$, $p < .001$. B=.51, SE=.04, $\beta = .52$, $p < .001$. Number of close friendships moderated Lon-soc Anx.	N/A	N/A
He et al. (2014), China	Internet addiction (through university screening)	162 (100)	n.s.	19.23	None	SDS	Lon-Dep, $r = .33$, $p < .001$.	N/A	N/A
Ward et al. (2010), USA	Depression (part of longitudinal cohort)	29 (51.7)	n.s.	12.9	Control group with no depression symptoms (low score on RCDs, $N = 63$)	RCDS	n.s.	Over 1–3 years, Lon \rightarrow Dep $F(1, 86) = 20.11$, $p < .001$.	N/A
Weeks et al. (2009), Canada	Social phobia (school students)	31 (61.3)	7–8	7.57 (0.31)	Non-anxious peers ($N = 95$)	SASC-R, Child Behaviour Scale (teacher)	Socially anxious children reported significantly more Lon, $F(1, 121) = 54.73$, $p < .001$, $\eta^2 = .311$.	N/A	N/A

Continued

Table 1. (Continued)

Author (year), country	Sample		Comparison group		Loneliness measure	Mental Health Measure(s) – self-reported unless stated	Association and between and group differences Lon –loneliness Dep – depression Anx – anxiety		Longitudinal results
	Condition (recruitment)	Age range at baseline (years)	Total N (% males)	Mean age (SD)					
Neurodevelopmental disorders Houghton et al. (2020), Australia	ADHD	10–18	84 (75)	13.4 (2.0)	PALS	CDI-II	ADHD group higher Dep ($F = 8.94, p = .005$), lower friendship related Lon (i.e., quality of friendships) ($F = 8.43, p = .005$), greater feelings of isolation ($F = 8.95, p = .003$). Friendship related Lon–Dep, $B = -.30$, $\beta = -.043, p < .001$. Isolation–Dep, $B = 0.26, \beta = 0.31, p < .001$ Lon–Anx, $r = .325$.	N/A	
	ASD	7–14	20 (90)	12.08 (1.78)	LS	MASC	Social Lon–Social Anx, $r = .59, p = .01$. Lon–social Anx, $r = .30, p = .04$. High-anxiety group ($N = 5$) scored higher on ‘social’ loneliness ($t = 2.57, p < .05$). Whole sample: Lon–Anx, $r = 0.442, p < .001$. ASD group reported higher Lon. Those with ASD with greater Anx reported higher Lon ($b = 0.442, p < .001$) than adolescents without ASD ($b = 0.196, p = .049$).	N/A	
Chang et al. (2019), Taiwan	ASD	10–19	101 (83.2)	15.6 (n.s)	UCLA Loneliness Scale – short form	BAI		N/A	
Intervention studies Alfano et al. (2009), USA	Social phobia (secondary data analysis of participants from the intervention arm of 2 RCTs of behavioural therapy)	7–17	88 (51)	11.2 (2.35)	LS	ADIS-C/P, SPAL-C, CDI	Pre-treatment: Lon–Dep, $r = 0.65, p < .05$ Lon–Anx, $r = 0.15$ Lon–soc Anx $r = 0.32, p < .05$ Post-treatment: Lon–Dep $r = 0.54, p > .05$	Pre-treatment Lon–post-treatment Dep, $r = 0.50$, $p < .05$. Lon \rightarrow soc phobia severity, and soc Anx scores post-treatment ($\beta = .25, p = .02$). Additionally, changes in loneliness - mediated changes in soc Anx ($\beta = .13, p = .03$).	

Continued

Table 1. (Continued)

Author (year), country	Sample		Comparison group		Loneliness measure	Mental Health Measure(s) – self-reported unless stated	Association and between and group differences		Longitudinal results
	Condition (recruitment)	Total N (% males)	Age range at baseline (years)	Mean age (SD)			Lon – loneliness	Dep – depression	
Haslam et al. (2016), Australia	Elevated distress (university students screened and recruited into a non-randomized trial of social identity intervention: G4H)	81 (34.6)	n.s.	20.95 (5.05)	Controls (n = 75) matched on age, gender, and treatment history.	Friendship Scale	Social Phobia Inventory, DASS-21	n.s.	Participation in G4H: Lon significantly improved from pre- to post-treatment. Cohen's d .86, p < .001. Effects sustained 3 months post-treatment. Whole sample: Lon decreased by 7.64 points by follow-up, suggesting a large effect (Cohen's d = .94).
Lim et al. (2019), Australia	Social phobia (clinic referred, recruited into pilot study of positive psychology digital intervention targeting loneliness)	9	18–23	21 (1.41)	Controls with no mental health conditions (N = 11).	Revised UCLA Loneliness Scale	Social Interaction Anxiety Scale; CES-D	n.s.	
Suvag et al. (2017), USA	Social phobia (via schools and community)	29 (41.4)	7–12	9.17 (1.77)	Healthy controls (N = 63)	LS	ADIS-C/P, CBCL (mother), TRF (teacher)	Social phobia group experienced more Lon than the comparison group [F(1,84) = 9.7, p < 0.003, $\eta^2 = 0.10$].	Lon [F(1,84) = 11.38, p = 0.001, $\eta^2 = 0.12$] decreased significantly following treatment.

Note. ADIS-C/P = Anxiety Disorders Interview Schedule for Children; Anx = anxiety; BAI = Beck Anxiety Inventory; CBCL = Child Behaviour Checklist; CDI = Children's Depression Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; CMAS-R = Children's Manifest Anxiety Scale-Revised; DASS-21 Depression, Anxiety, and Stress Scale; Dep = depression; Lon = loneliness; LS = Asher Loneliness Scale; LSDQ = Loneliness and Social Dissatisfaction Questionnaire; MASC - Multidimensional Anxiety Scale for Children; n.s. = not specified; PALS = Perth Aloneness Scale; RCADS = Revised Children's Anxiety and Depression Scale; RCDS = Reynolds Child Depression Scale; SAS-A = Social Anxiety Scale for Adolescents; SASC-R = Social Anxiety Scale for Children = Revised; SDS = Zung Self-rating Depression Scale; SPAI-C = Social Phobia and Anxiety Inventory for Children; TRF = Teacher Rating Form; YSR = Youth Self-Report Form.

intervention. Three of these longitudinal studies (e.g., Haslam, Cruwys, Haslam, Dingle, & Chang, 2016; Lim et al., 2019; Suveg et al., 2017) were non-randomized intervention studies, which reported pre- and post-intervention measures, and one study (e.g., Alfano et al., 2009) used secondary data from two randomized control trials but included only the data from the active intervention arms.

Quality of the included studies varied. Several of the cross-sectional studies had small non-representative samples, which limits generalizability. Most relied on self-report measures of loneliness and mental health symptoms, which introduces threats to validity including negative affectivity and common method variance. These were usually completed at only one time point, preventing meaningful analysis of the relationship between outcome and exposure. However, self-report methods are commonly used because other methods such as direct observations or reports by other people (e.g., parents and teachers) are often constrained by resources. Future research on loneliness and loneliness interventions in children and adolescents would benefit from using a range of methods and informants to assess these constructs. Although the non-randomized intervention studies had robust aspects to their design (e.g., strict inclusion and exclusion criteria, consistent intervention delivery, limited loss to follow-up), they all lacked sufficient statistical power due to small sample sizes. The longitudinal research included allow examination of the temporal relationship between exposure to loneliness and mental health outcomes, but these often relied on self-report of both variables (loneliness and mental health outcomes). However, studies often relied on a range of self-reported measures. Different researches often used different measures, both for exposures and for outcomes, many of which were only recorded at a single time point. Few studies controlled or adjusted for important confounding variables.

Is loneliness associated with mental health problems in children and young people with pre-existing mental health needs both cross-sectionally and prospectively?

Seven studies examined the cross-sectional relationship between loneliness and severity of mental health symptoms (Table 1). Of these, four studies examined loneliness and social anxiety. Three studies found that socially anxious children reported significantly more loneliness than children who were not anxious (Beidel, Turner, & Morris, 1999; Beidel et al., 2007; Weeks, Coplan, & Kingsbury, 2009), with small-to-moderate effect sizes ($\eta^2 = .311, .426$; Beidel et al., 2007; Weeks et al., 2009). Erath, Flanagan, Bierman, and Tu (2010) reported that social anxiety symptoms were positively correlated with higher loneliness in adolescents ($r = .53$).

Three studies reported a positive correlation between loneliness and symptoms of anxiety (between $r = .33$ and $r = .35$) and depression (between $r = .33$ and $r = .66$) (Ammerman, Kazdin, & Hasselt, 1993; Ebesutani et al., 2015; He, Zhou, Li, Cao, & Guan, 2014). Specifically, one of the studies reported that loneliness significantly mediated the relationship between anxiety and depression symptoms; that is, those who were anxious and lonely were more likely to be depressed (Ebesutani et al., 2015). However, one study found that after controlling for IQ, depression symptoms and loneliness were no longer associated in a community sample of 109 children aged 6–12 years ($r = .06$; Ammerman et al., 1993). In another study, the number of close friendships was a significant moderator of loneliness and social anxiety in adolescents (Erath et al., 2010). Social support was negatively correlated with loneliness ($r = -.44$) and partially mediated the relationship between loneliness and depression in a sample of 'internet addicts' (p. 2), that is, young people with symptoms of an Internet addiction (He et al., 2014).

Only one prospective study (Ward, Sylva, & Gresham, 2010; see Table 1) examined whether loneliness (among other variables, i.e., social skills, academic competence) in children and young people with elevated symptoms of depression predicted subsequent depression symptoms. Children and young people were classified as those with 'probable' depression, that is, a score equal to or greater than 70 on the RCADS; and those without 'probable' depression, that is, a score less than 70 on the RCADS. Loneliness was assessed once a year when participants were in grades 3, 4, and 5 (i.e., ages 8-9, 9-10, and 10-11 years). Loneliness was a significant predictor of depression group membership at grade 3 ($\eta^2 = .07$) and grade 5, with a large effect ($\eta^2 = .42$), but not at grade 4.

Is loneliness associated with the mental health of children and young people with neurodevelopmental conditions?

Three studies examined cross-sectional association between loneliness and mental health in children and young people with attention-deficit/hyperactivity disorder (ADHD; $N = 1$, Houghton et al., 2020) and ASD ($N = 2$, White & Roberson-Nay, 2009; Chang, Chen, Huang, & Lin, 2019). Loneliness was positively associated with depression severity in young people with ADHD, and participants with ADHD were lonelier than age- and gender-matched controls (Houghton et al., 2020). For participants with ASD, there were moderate associations between anxiety and loneliness in both younger adolescents aged between 7 and 14 years ($r = .33$, White & Roberson-Nay, 2009) and older adolescents aged between 10 and 19 years ($r = .44$, Chang et al., 2019). Thus, in both ASD studies, there was evidence that young people who were more anxious also scored higher on loneliness. Loneliness was positively correlated ($r = .50$) with severity of social anxiety symptoms in young adolescents with ASD (White & Roberson-Nay, 2009).

What treatments/interventions are effective for improving outcomes in children and young people with mental health problems experiencing loneliness?

Four longitudinal studies measured loneliness and mental health outcomes following psychological interventions (see Table 1). Two studies directly addressed loneliness using two different interventions (e.g., Haslam et al., 2016; Lim et al., 2019). The remaining two studies included interventions developed specifically to target social anxiety. Three studies included samples of children and young people with social anxiety aged 7 to age 23 years (Alfano et al., 2009; Lim et al., 2019; Suveg et al., 2017). One was a small pilot study ($N = 9$, Lim et al., 2019), one was a randomized control trial ($N = 92$, 29 of whom had social anxiety disorder, Suveg et al., 2017), and one was secondary data from the behavioural therapy arm of two randomized controlled trials ($N = 88$, Alfano et al., 2009). One pilot study focused on 81 university students who met the threshold for moderate distress according to a screening questionnaire (Haslam et al., 2016).

Each of the three social anxiety intervention studies evaluated a different intervention and used different measures. Alfano et al. (2009) evaluated Social Effectiveness Therapy for Children (SET-C), a 12-week manualized behavioural treatment for children and young people. This treatment for social anxiety includes social skills training and peer generalization in face-to-face, individual and group settings and is aimed at treating social anxiety. Lim et al. (2019) piloted '+Connect', which is a smartphone application, used daily for 6 weeks, and designed to target loneliness in young people. They compared the effects in clinically referred participants to those in a control group with no mental health conditions. Suveg et al. (2017) randomized children to cognitive behavioural therapy with

emotional regulation (ECBT) or to traditional cognitive behavioural therapy (CBT), both delivered face-to-face. ECBT was designed to improve social functioning and was delivered over 10 weekly, 1-hour sessions. Lim et al. (2019) and Suveg et al. (2017) reported significant reductions in loneliness scores from baseline to post-treatment, and Lim et al. (2019) found that this was maintained at 3-month follow-up, with a large effect size ($d = .94$).

Alfano et al. (2009) conducted a secondary analysis on data from two randomized controlled trials and found that loneliness at baseline reported by the child significantly mediated the relationship between pre- and post-treatment social anxiety scores reported by parent(s) ($\beta = .13$, $p = .03$). Pre-treatment loneliness reported by the child was also associated with parents' ratings of the child's symptoms of depression ($r = .50$) and social anxiety post-treatment ($\beta = 0.25$). However, data were not reported about changes in loneliness from pre- to post-treatment.

For university students (mean age 20.95 years) experiencing elevated distress, a digital 5-module social identity intervention, 'Groups 4 Health' (G4H), targeted the development and maintenance of social group relationships (Haslam et al., 2016). This group-based intervention aimed to equip individuals with the skills and knowledge needed to manage and develop their social identifications and consequently encouraged connectedness. G4H included five modules delivered weekly (between 60 and 75 mins per session). Each session included exercises and discussions relating to different components of group life, for example, the benefits of social memberships on health. The intervention was manualized and delivered by trained facilitators, who were given a therapist's manual to help ensure modules were delivered consistently. Participants reported significantly less loneliness ($p < .001$, $d = .86$), depression ($p < .05$, $d = .29$), and anxiety ($p < .001$, $d = .56$) at the end of the intervention, and these changes were maintained at six-month follow-up. However, this was a non-randomized intervention, so the risk of bias is high. Nonetheless, given the lack of intervention studies identified in this review, this study provides useful data about an intervention used with children and adolescents.

Discussion

This rapid systematic review found evidence that, for young people who have mental health problems, loneliness is associated with the severity of mental health symptoms, both cross-sectionally and prospectively. This is important given that loneliness is prevalent during adolescence (Lasgaard et al., 2016). The review was conducted to help understand potential implications of enforced social isolation in the context of the COVID-19 pandemic during which many young people have reported increased levels of loneliness (Mental Health Foundation, 2020). The studies we included found that loneliness was positively correlated with an increase in severity of current depression and anxiety, and with the severity of future mental health problems up to 3 years later. These results were consistent across participants who reported elevated symptoms, those with formal diagnoses of mental health disorders, and children and young people with neurodevelopmental conditions.

Some of the longitudinal studies included measured loneliness and mental health problems at baseline and then, subsequently, measured mental health problems again up to 3 years later. Although few studies took this approach, this finding is consistent with studies in adults (e.g., Ge et al., 2017; Wang et al., 2018). Thus, these data suggest that for vulnerable children and young people, loneliness may amplify existing problems and

increase future mental health problems. It may therefore be helpful to specifically promote and support social contact for children and young people with mental health problems and those with neurodevelopmental problems. This is an area that warrants urgent investigation.

There was some evidence that specific psychological interventions might help to reduce or mitigate the effects of loneliness on mental health for children and young people. Two digital interventions that were specifically targeted at loneliness or social identity, a positive psychology mobile app designed to target loneliness, +Connect (Lim et al., 2019), and a 5-module computerized positive psychology intervention (Haslam et al., 2016), showed promising pilot data. However, both interventions were developed for and evaluated with young adults and may not be developmentally appropriate for younger children and adolescents. Furthermore, both studies recruited participants who had mental health symptoms, rather than those who were necessarily particularly lonely. This is important because there is a clear distinction between interventions for those with a primary mental health problem that measure loneliness, and interventions targeted and designed specifically for prolonged loneliness. In the latter case, mental health problems may be secondary. The lack of robust evidence about loneliness interventions is consistent with a recent meta-analysis of loneliness interventions for young people (Eccles & Qualter, 2021), which found little evidence of targeted interventions for those who are lonely. Instead, interventions often targeted children and young people viewed to be at risk of loneliness, that is, those with health concerns (Eccles & Qualter, 2021). Therefore, although psychological interventions for specific mental health problems may be effective in reducing loneliness, much more extensive investigation is required.

Strengths and limitations

We followed Cochrane rapid review guidelines (Garritty et al., 2020) to optimize the number of relevant papers retrieved. Consistent with these guidelines, both trial registry databases and grey literature were not searched. Only publications written in English language were included, and hand-search strategies were not used although we did hand-search the first 50 references within the Cochrane library. Also, during data extraction, authors were not contacted to request additional information; therefore, some studies may have been missed.

Given that the terms 'social isolation' and 'loneliness' are often used interchangeably, we included both terms in the search strategy of this paper. This lack of clear distinction between the terms is problematic, especially in the context of this review, given that the social isolation experienced as a result of being rejected by peers is likely to be different to social isolation that occurs in a pandemic. The search results focused on what we classified as 'loneliness' rather than social isolation. Given that we know very little about the associations between loneliness and mental health in young people with pre-existing mental health needs, we included all studies that met our inclusion criteria.

Most of the evidence on the relationship between loneliness and mental health outcomes was cross-sectional. Thus, although these consistently reported a positive correlation between loneliness and mental health symptoms, no conclusions about causality can be drawn. It is possible that mental health problems amplify social isolation and loneliness **and** that social isolation and loneliness amplify existing mental health problems; thus, the relationship is likely to be bidirectional. This is consistent with the relationship in adults where more than half (57%) in a study of 2,256 adults who had experienced depression or anxiety described isolating themselves away from family and

friends, resulting in further loneliness (Mental Health Foundation, 2017). In addition, almost every study relied on self-report measures of both loneliness and mental health symptoms, completed on the same day. This introduces the significant problems because negative affect and common method variance are likely to inflate the correlations between the constructs (Sharma, Yetton, & Crawford, 2009). Best practice in the assessment of mental health problems is to use multi-informant reports (Kraemer et al., 2003). Only one study (Alfano et al., 2009) assessed symptoms in this way and found that self-reported loneliness predicted parents' and teachers' assessment of the child's mental health. We did not examine mediating and moderating factors; however, it may be useful for future studies to focus on these factors to identify psychosocial targets for treatment such as techniques and/or strategies that may be helpful for this population. A significant limitation in the interpretation of data from the four intervention studies is that these were underpowered and were not randomized. A possible reason for sufficient lack of statistical power in these studies is difficulty recruiting children and young people with social anxiety due to high avoidance of services (Lim et al., 2019). Also, three of four studies focused on social anxiety interventions; and therefore, it is not possible to draw conclusions about other common mental health problems such as depression.

We included studies with a wide age range (6–23 years) to make the review as valuable as possible. However, it could be argued that the experience of loneliness and interventions for loneliness are likely to be different for children as young as 6 years compared with young people aged 23 years. To better understand age effects, future research should consider the effects of loneliness on children and young people in distinct developmental periods, that is, 'childhood' 'adolescence' and 'early adulthood'.

Implications for policy and practice

This review suggests that loneliness is associated with the severity of mental health symptoms reported by children and young people who have pre-existing mental health problems. Thus, loneliness is a key risk factor likely to impact on mental health and we need to minimize the duration of loneliness where possible, with particular attention to those who are vulnerable due to pre-existing mental health problems.

We found some evidence that psychological interventions for social anxiety in youth can reduce loneliness but no research that assessed interventions specifically targeted at reducing loneliness in children or young people. The data from young people suggest that social support may moderate the relationship between loneliness and depression (He et al., 2014). Therefore, it is possible that increasing social support (e.g., during periods of social isolation) may reduce children and young people's experience of loneliness. This is consistent with the results of research conducted with adults (Wang et al., 2018). Thus, maintaining the quality and quantity of social relationships, helping young people to feel part of a group, and experiencing social rewards may help reduce loneliness. Therefore, in the COVID-19 context, enforced social isolation means that social relationships may need to be maintained through using digital/online methods of communication, this may also have important implications for mental health. Specifically, evidence has shown that adolescents aged 11–16 years who spent more time talking to others via voice/video call during lockdown had fewer symptoms of hyperactivity and inattention one month later (Cooper et al., 2021). However, as social distancing measures ease and schools resume, catching up socially and emotionally should be prioritized in the same way as catching up academically. Importantly, those with pre-existing mental health problems may need particular support to enable them to 'catch up' given that by definition, they are likely to

already have been struggling with functioning. Therefore, they may need a targeted, individualized approach. Similarly, it may be important for those who support young people including parents/guardians and teachers to be aware of the signs of loneliness in young people and how to manage this. For example, Loades, Demkowicz, Qualter, and Shafran (2021) presented a brief, practical guide based on evidence, which suggests that talking about loneliness and helping to support young people in rebuilding their social skills may be effective in helping young people manage their loneliness.

Young people and their families need to know who they can contact if they are struggling, and it is imperative that a range of support is in place and readily available to help them. At the lower levels of intensity, parent-led self-help approaches (e.g., Creswell, Parkinson, Thirlwall, & Willetts, 2019) and computerized CBT-based programmes with therapist input may be useful (e.g., Grist, Croker, Denne, & Stallard, 2019; Pennant et al., 2015). And at the higher levels of intensity, it is essential that more specialist mental health services are prepared to deal with an increase in demand and can provide evidence-based treatments in a timely and accessible manner, including remotely where necessary. Encouragingly, services have started to offer remote treatment (Badawy & Radovic, 2020) and preliminary research indicates that remotely delivered therapy has equivalent therapeutic outcomes as face-to-face interventions (Nelson & Patton, 2016; Wind, Rijkeboer, Andersson, & Riper, 2020).

Conclusion

This rapid, systematic review highlights that loneliness is positively correlated with symptoms of depression and anxiety in children and young people with pre-existing mental health problems. This is highly relevant in the current context of COVID-19 since enforced social isolation measures may increase loneliness. There was some evidence that specific psychological interventions might help to reduce the effects of loneliness on mental health for children and young people. However, interventions that target loneliness in this vulnerable group that are accessible during periods of social isolation are much needed, and it may be helpful to integrate these into evidence-based interventions for mental health problems.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Emily Hards: Formal analysis (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal). **Maria Elizabeth Loades:** Conceptualization (equal); Formal analysis (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal). **Nina Higson-Sweeney:** Formal analysis (equal); Methodology (equal); Writing – review & editing (equal). **Roz Shafran:** Conceptualization (equal); Formal analysis (equal); Writing – review & editing (equal). **Teona Serafimova:** Methodology (equal); Writing – review & editing (equal). **Amberley Brigden:** Methodology (equal); Writing – review & editing (equal). **Shirley Reynolds:** Conceptualization (equal); Formal analysis (equal); Writing – review & editing (equal). **Esther Crawley:** Conceptualization (equal); Formal analysis (equal); Writing – review & editing (equal). **Eleanor Chatburn:** Methodology (equal); Writing – review & editing (equal). **Catherine Linney:** Methodology (equal); Writing – review & editing (equal). **Megan McManus:** Methodology (equal); Writing – review & editing (equal). **Catherine Borwick:** Methodology (equal); Writing – review & editing (equal).

Data availability statement

Data sharing is not applicable to this article as no data sets were generated or analysed during the current study.

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Appendix : Database searches – 29/03/2020Ovid MEDLINE (R)

1	exp Adolescent/ or exp Child/ or exp Child, Preschool/ or exp Infant/ or exp Minors/ or exp Pediatrics/	3,533,050
2	(adolesc* or preadolesc* or pre-adolesc* or boy* or girl* or child* or infan* or preschool* or pre-school* or juvenil* or minor* or pe?diatri* or pubescen* or pre-pubescen* or prepubescen* or puberty or teen* or young* or youth* or school* or high-school* or highschool* or schoolchild* or school child*).tw,kf.	2,951,684
3	1 or 2	4,748,091
4	quarantine*.tw,kf.	4,350
5	exp Quarantine/	2,093
6	Quarantine.tw,kf.	3,975
7	exp social isolation/	17,148
8	(isolation and (infect* or SARS or influenza or flu or MERS or ebola or COVID-19)).tw,kf.	34,141

Continued

Appendix (Continued)

9	exp Loneliness/	3,552
10	4 or 5 or 6 or 7 or 8 or 9	56,227
11	anxiet*/ or anxious*/ or "anxiety disorder*".tw,kf.	29,320
12	depress*/ or "internal* disord*"/ or "low mood".tw,kf.	737
13	depressive disorder/	72,188
14	exp depression/	115,922
15	depress*.tw,kf.	445,459
16	exp adjustment disorders/	4,197
17	adjustment disorder*.tw,kf.	1,642
18	low mood.tw,kf.	737
19	obsessive-compulsive disorder.tw,kf.	12,336
20	stress disorders, traumatic/	672
21	stress disorders, post-traumatic/	31,840
22	trauma*.tw,kf.	353,295
23	((post-trauma* or posttrauma*) adj stress) or PTSD).tw,kf.	35,040
24	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	853,134
25	3 and 10 and 24	1,277

Full references saved as MEDLINE 290320 v1

Ovid PsycINFO

1	(adolescent or child or child, preschool or infant or minor or pediatrics).ti,ab,id.	425,212
2	(adolesc* or preadolesc* or pre-adolesc* or boy* or girl* or child* or infan* or preschool* or pre-school* or juvenil* or minor* or pe?diatri* or pubescen* or pre-pubescen* or prepubescen* or puberty or teen* or youth* or school* or high-school* or highschool* or schoolchild* or school child*).ti,ab,id.	1,227,549
3	1 or 2	1,227,549
4	quarantine.ti,ab,id.	179
5	exp *Social Isolation/	5,944
6	(isolation and (infect* or SARS or influenza or flu or MERS or ebola or COVID-19)).ti,ab,id.	437
7	Disease containment*.ti,ab,id.	5
8	Lonel*.ti,ab,id.	10,569
9	exp *loneliness/	3,642
10	4 or 5 or 6 or 7 or 8 or 9	16,688
11	anxiet*/ or anxious*/ or "anxiety disorder*".ti,ab,id.	33,786
12	depress*/ or "internal* disord*"/ or "low mood".ti,ab,id.	673
13	exp *depression/	19,678
14	depress*.ti,ab,id.	301,583
15	exp adjustment disorders/	719
16	adjustment disorder*.ti,ab,id.	1,851
17	obsessive-compulsive disorder.ti,ab,id.	15,268
18	post-traumatic stress disorder.ti,ab,id.	10,195
19	trauma*.ti,ab,id.	107,899
20	((post-trauma* or posttrauma*) adj stress) or PTSD).ti,ab,id.	44,403
21	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20	431,601
22	3 and 10 and 21	1,303

Appendix (Continued)

Full references saved as PsycINFO 290320 v1.

Web of Science Core Collection

# 22	3,211	#21 AND #10 AND #3
# 21	1,173,555	#20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11
# 20	64,185	TS=((post-trauma* or posttrauma*) NEAR stress) or PTSD)
# 19	387,085	TS=trauma*
# 18	15,994	TS=post-traumatic stress disorder
# 17	25,733	TS=obsessive-compulsive disorder
# 16	22,119	TS=adjustment disorder*
# 15	22,104	TS=adjustment disorders
# 14	627,349	TS=depress*
# 13	494,240	TS=depression
# 12	628,267	TS=(depress* OR " internal* disord* " OR " low mood ")
# 11	283,559	TS=(anxiet* OR anxious* OR " anxiety disorder* ")
# 10	77,296	#9 OR #8 OR #7 OR #6 OR #5 OR #4
# 9	12,570	TS=loneliness
# 8	15,420	TS=Lonel*
# 7	2,586	TS=Disease containment*
# 6	35,721	TS=(isolation and (infect* or SARS or influenza or flu or MERS or ebola or COVID-19))
# 5	17,794	TS=social isolation
# 4	8,759	TS=quarantine
# 3	3,591,598	#2 OR #1
# 2	3,581,837	TS=(adolesc* or preadolesc* or pre-adolesc* or boy* or girl* or child* or infan* or preschool* or pre-school* or juvenil* or minor* or pe?diatri* or pubescen* or pre-pubescen* or prepubescen* or puberty or teen* or youth* or school* or high-school* or highschool* or schoolchild* or school child*)
# 1	2,450,709	TS=(adolescent OR child OR child, preschool OR infant OR minor OR pediatrics)

Applied 'English language' limit = 3,012.