



Inconclusive Findings in Studies of the Link Between Media Coverage of Mass Trauma and Depression in Children

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Abstract

Purpose of Review This paper reports a review of the empirical research examining the association between mass trauma media contact and depression in children, the factors that may influence the association, and the difficulties encountered in the study of media effects on depression.

Recent Findings All of the included studies assessed general population samples. Pre-COVID-19 research focused primarily on television coverage alone or on multiple media forms including television, while COVID-19 media studies examined various media forms including social media. Most studies used cross-sectional design and non-probability sampling. The review revealed inconclusive findings across studies.

Summary The study of mass trauma media effects on depression in children is complicated by a number of potential confounding factors and by the relatively high prevalence of depression in the general population. Media contact was a relatively minor consideration among other interests in the extant studies which failed to explore numerous issues that warrant attention in future research.

Keywords Children and COVID-19 · Children and disasters · Children and terrorism · Depression · Disaster media coverage · Mass trauma media coverage

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Introduction

The COVID-19 pandemic is a stark reminder that disasters and other types of mass trauma present frequent and widespread threats to children around the world. Mass trauma events affect children who are directly exposed, those exposed through significant others, and those with no close personal involvement whose only connection is through communication channels and the effects on their community and society. Mass trauma media coverage has the potential to reach large numbers of people including those who are only indirectly or remotely affected as well as those personally involved in an event. A growing literature describes the effects of mass trauma media coverage on children, both those who are directly and indirectly affected by the event. Most of this literature has focused on post-traumatic stress reactions despite the importance of other emotional outcomes such as anxiety and depression which may create an even greater psychological burden [1]. As the second most commonly reported child disaster outcome [2] and a leading and enduring cause of disability worldwide [3], depression is of particular interest.

A recent meta-analysis of studies of mass trauma media contact and depression revealed a small positive association in adult, but not child, samples [4••]. Numerous issues raised in the meta-analysis and other publications warrant greater attention. Specifically, a focused review of the confounds and of methodological issues may clarify aspects of the relationship between mass trauma media contact and depression and help to direct future research on this topic. Further, all of the studies included in the meta-analysis were conducted before the onset of the COVID-19 pandemic, a disaster of unparalleled magnitude resulting in global health, social, economic, and political upheaval. Public health measures implemented during the pandemic resulted in widespread and prolonged closure of schools and home confinement which raised concern about changes in children's lifestyle behaviors (e.g., physical activity and sedentary behavior, diet, sleep) and screen time (i.e., time spent using electronic devices such as television, movies, computers, movies, smartphones, video games).

The Current Review

The current report describes a review of the empirical literature examining children's depression and mass trauma media contact which was conducted to (1) augment the recent meta-analysis on depression and anxiety [4••] with more recent research including COVID-19 studies and (2) focus specifically on depression and confounding factors. After describing the search process and presenting the

results, the discussion focuses on factors that may influence the association between mass trauma media contact and depression, issues related to studying depression as an outcome, and concerns about attributing cause in the association. Issues for future study are identified.

Methods

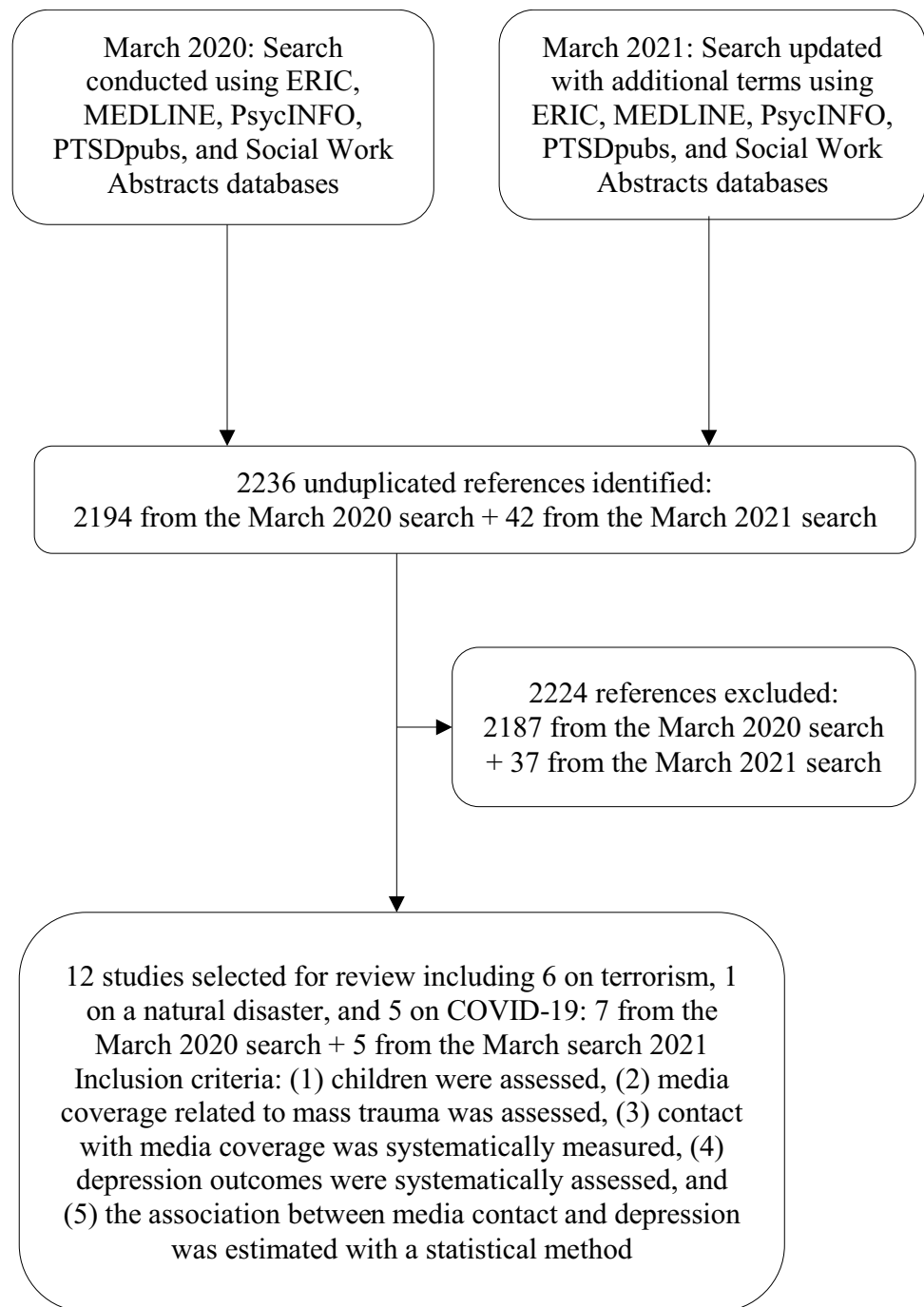
An initial literature search to identify empirical research meeting inclusion criteria was conducted in March 2020 using ERIC, MEDLINE, PsycINFO, PTSDpubs, and Social Work Abstracts databases. Search terms were selected to locate references on the association between depression and/or anxiety outcomes and consumption of media coverage (broadcast, internet, magazine, newspaper, print, radio, social media, television, TV, web) of mass trauma (bombing, disaster, earthquake, fire, flood, hurricane, mass shooting, political conflict, September 11, terrorism, terrorist incident, tornado, tsunami, war). The search was restricted to publications in peer-reviewed journals and to English language sources, with no restrictions on participant age nor publication date. To identify publications since the initial search, another search was conducted in March 2021 using the same databases with additional search terms to capture literature on epidemics, pandemics, and COVID-19 as well as more recent publications on other mass trauma events. Studies were included in this review if: (1) children were assessed, (2) media coverage related to mass trauma was assessed, (3) contact with media coverage was systematically measured (e.g., dose of contact such as number of hours spent watching disaster television coverage, content of disaster coverage consumed), (4) depression outcomes were systematically assessed, and (5) the association between media contact and depression was estimated with a statistical method. Together the searches, and articles known to the authors, yielded a total of 12 articles on media contact and children's depression outcomes in the context of mass trauma (see Fig. 1).

Descriptive Findings in the Literature

Empirical studies on children's depression reactions to disaster media coverage are described below (see Table 1 for a summary of the 12 studies [5, 6, 7, 8••, 9, 10, 11•, 12, 13, 14••, 15••, 16] included in this review).

Events, Samples, and Participant Exposure

The studies in this review of media contact and depression examined children in the context of terrorism, especially the September 11 attacks (5 studies) [5, 8••, 9, 10, 11•, 12], along with a study in Israel [6] and of the global COVID-19

Fig. 1 Flowchart of the literature search

pandemic (5 studies) [7, 13, 14••, 15••, 16]. Despite several major natural disasters (e.g., 2004 Indian Ocean earthquake and tsunami, the 2011 Great East Japan earthquake and tsunami) that attracted worldwide attention through the media, only one study was conducted in the context of a natural disaster—the 2008 Sichuan earthquake in China [11•] (see Table 1). All of these events had wide-reaching communal effects on general populations as well as on those who were directly exposed and personally involved. None of the 12

studies in this review analyzed media contact in relationship to participants' event exposure.

All of the pre-COVID-19 studies in the current review assessed samples derived from general populations in schools, the disaster community, and distant communities rather than samples chosen for specific exposures (e.g., directly-exposed children); some of these samples included directly exposed children and/or children exposed through the experiences of family members or others as well as those

Table 1 Description and findings of studies examining the link between disaster media coverage and depression in children

Study Event Location Timing	Design Sampling Informant	Sample source Sample size Sample description Exposure	Media form Measurement	Depression measurement Pre-/Post-event	Media contact Depression media association
Aber et al. [5] September 11 attacks New York City, USA 5 years before (baseline) and 1.34 to 722 days (M = 450 days) after the attacks	Longitudinal design Convenience sampling Child report	School-based sample in the disaster community N = 768 Aged 6–14 years at pre-event baseline and 12–20 years at post-event assessment Direct, family, and community exposure	Television, newspaper, radio, magazines, and Internet and web sites One composite variable How much the participants reported “learning about the event” from the media source	Depression symptoms Pre- and post-event	The majority reported watching a lot (67%) or some (28%) television coverage about the attack The majority reported listening to or reading a lot (54%) or some (38%) radio, newspaper, or magazine coverage Web sites were the least used source of information; the web was used a lot by 12%, some by 25%, and never by 63% to obtain information Pre-event depression symptoms predicted slightly less media consumption post event No association was found between media contact and depression symptoms
Barile et al. [6] Suicide bombing Dimona, Israel Approximately 9 months before (baseline) and 2 months after the attack	Longitudinal design Convenience sampling Child report	Middle school sample in the disaster community N = 90 Direct, interpersonal, and community exposure	Television Proportion of television viewing that was terrorism related	Depression symptoms Pre- and post-event	Pre-bombing depression was positively associated with post-bombing depression for boys but not for girls Neither physical proximity to the event nor exposure to terror-related television coverage was associated with increased symptoms of depression for boys or girls No association was found between media contact and either pre- or post-event depression symptoms
Elis et al. [7] COVID-19 Ontario, Canada 3 weeks after school closure for COVID-19	Cross-sectional design Convenience sampling Child report	Regional sample during school closure N = 1,054 High school students (grade 9–12) Aged 14–18 years (M = 16.68 years) Event exposure was not described but the study was conducted during school closure and home confinement	Social media (e.g., Facebook, TikTok, Snapchat, Instagram; all one variable) Frequency (hours per day on average) News consumption Frequency (amount of time “watching and reading news on COVID-19” on a daily basis) Separate variables	Depression symptoms Post-event	The majority (58.3%) reported watching or reading 30 min or less per day of COVID-19 news COVID-19 related news consumption was related to higher COVID-19 stress but not depression Social media time after the onset of the COVID-19 crisis was positively associated with depression The association between COVID-19 stress and depression was highest in those with the highest social media use after the onset of the pandemic

Table 1 (continued)

Study Event Location Timing	Design Sampling Informant	Sample source Sample size Sample description Exposure	Media form Measurement	Depression measurement Pre-/Post-event	Media contact Depression media association
Geronazzo-Alman et al. [8••] September 11 attacks New York City, USA 6 months after the attacks	Cross-sectional design Probability sampling Child report	School-based sample in the disaster community N = 8,236 Grades 4 to 12 Aged 8–21 years (M = 13.6 years) Direct, interpersonal, and community exposure	Television (with or without adults); websites; and radio/newspapers/magazines Separate variables Frequency (defined as “a lot of time spent learning about the attack”)	Probable major depressive disorder Used a cutoff score Post-event	Major depressive disorder was positively associated with television contact (in or not in the presence of adults) and with radio/newspaper/magazine contact after adjusting for posttraumatic stress disorder and grief
Gershoff et al. [9] September 11 attacks New York City, USA 4 months–2 years (M = 15 months) after the attacks	Cross-sectional design Convenience sampling Child and parent report	Community based sample in the disaster community N = 427 Aged 12–20 years (M = 16.2 years) Direct, interpersonal, and community exposure	Television; newspapers, radio, or magazines; or websites One composite variable How much they learned about the event form each of the three media forms	Depression symptoms Post-event	Nearly all (96%) youth reported learning about the attacks from television; 93% learned about the attacks from radio/newspaper/magazines; 38% used the internet to learn about the attacks No association was found between media contact and depression
Hoven et al. [10] September 11 attacks New York City, USA 6 months after the attacks	Cross-sectional design Probability sampling Child report	School-based sample in the disaster community N = 8,236 Aged 9–21 years Direct, interpersonal, and community exposure	Television High media exposure defined as “having spent a lot of time” watching television coverage of the attacks	Probable major depressive disorder Used a cutoff score Post-event	Media contact was positively associated with risk for probable anxiety/depressive disorders Each probable anxiety/depressive disorder, including major depressive disorder, had a higher prevalence at higher levels of exposure
Lau et al. [11•] 2008 Sichuan Earthquake China 1 month after the event	Cross-sectional design Convenience sampling Child report	Junior and senior high school sample in an affected community N = 3,324 61.7% were less than 15 years of age Direct, interpersonal, and community exposure	Media news reports/messages Frequency of (number of times) weeping while watching news News content (“exposure to scary or sorrowful or touching or encouraging news messages?”)	Probable depression Used a cutoff score Post-event	The majority frequently consumed touching or encouraging earthquake news content (71.7%) and wept while watching the news reports (56.4%) Consumption of scary earthquake news content was positively associated with depression Consumption of positive news messages was negatively associated with developing probable depression and suicidal ideation during the post-earthquake period

Table 1 (continued)

Study Event Location Timing	Design Sampling Informant	Sample source Sample size Sample description Exposure	Media form Measurement	Depression measurement Pre-/Post-event	Media contact Depression media association
Lengua et al. [12] September 11 attacks Seattle, Washington USA Pre-and post-attack, average time between was 6.78 months; assessments were 2 weeks to 2 months post-attack ($M = 29.06$ days)	Longitudinal design Convenience sampling Child and parent report	School sample in a distant community $N = 151$ Aged 9–13 years ($M = 10.93$ years) Interpersonal and distant exposure	Unspecified: “news or media coverage” Amount of media (news or media coverage)	Depression symptoms Pre- and post-event	Most parents tried to protect their children from information and images of the attack (58%) and limited television news viewing of children (60%) Parent report of limiting television viewing was related to parent and child report of children being upset about the attacks, but was unrelated to anxiety, depression, and conduct symptoms with the exception externalizing problems No association was found between media contact and post-event depression
Li et al. [13] COVID-19 Wuhan, China March 30 to April 7, 2020 (during quarantine)	Cross-sectional design Convenience sampling Child report	Disaster community sample during quarantine and school closure $N = 7,890$ Junior and senior high school students Aged 12–18 years Event exposure was not described but the study was conducted during school closure and home confinement	Screen time (not defined) Hours per day browsing information on COVID-19	Depression symptoms Post-event	Screen time was unrelated to depression Browsing information on COVID-19 for more than 2 h a day was positively associated with depression
Magson et al. [14••] COVID-19 New South Wales, Australia During the pandemic; about 2 months after stay-at-home orders were issued	Longitudinal design Sampling strategy unclear Child report	Regional sample during government restrictions $N = 248$ Aged 13–16 years ($M = 14.4$ years) Event exposure was not described but the study was conducted during school closure and home confinement	“Traditional news media” and social media (social media used for information seeking) Frequency: how often read/watched media reports about COVID-19 in a day and on average, how often read posts about COVID-19 on social media in a day Studied the two media variables separately	Depression symptoms Pre- and post-event	Depression increased from pre to post pandemic Both pre- and post-event depression were associated with COVID-19 social, but not traditional, media contact Frequency of COVID-19 traditional media (television, newspaper) contact and frequency of reading COVID-19 posts on social media had no significant effect on change in depression symptoms

Table 1 (continued)

Study Event Location Timing	Design Sampling Informant	Sample source Sample size Sample description Exposure	Media form Measurement	Depression measurement Pre-/Post-event	Media contact Depression media association
Murata et al. [15••] COVID-19 Study Location: USA and Pittsburgh, Pennsylvania USA During the first wave of the COVID-19 crisis	Cross-sectional design Convenience sampling Child report	National online and academic health-care center registry, outreach events, and patient portal sample N = 4,909 M = 40.3 years, 88.1% were ≥ 18 years (n = 4,326) Direct, interpersonal, and community exposure Conducted at the time the majority of states were lifting restrictions and school was recessing for the summer Assessed various aspects of exposure including COVID-19 testing, quarantine, relationship to COVID-19 survivors and victims, and social distancing	Internet, social media, COVID-19 media reports Separate variables Frequency: average number of hours per day	Depression symptoms Post-event	Higher number of hours spent on social media predicted depression symptoms Adolescents with more hours on social media were more likely to have moderate to severe depression symptoms Contact with COVID-19 media reporting was positively associated with risk for suicidal ideation or behavior Social media contact was positively associated with depression and contact with COVID-19 media coverage was positively associated with suicidal ideation and behavior
Yue et al. [16] COVID-19 Jiangsu Province, China During the pandemic (February 2020)	Cross-sectional design Sampling strategy unclear Child and parent report	Regional sample during home quarantine in a region that was not severely affected N = 1,360 Mean age = 10.56 years Event exposure was not described but the study was conducted during school closure and home confinement in a region that was not severely affected	Reading and watching COVID-19 news One composite variable Attention paid to COVID-19 information Time spent reading or watching COVID-19 news Degree of attention paid to the COVID-19 outbreak	Depression diagnosis Used a cutoff score Post-event	Neither time spent reading and watching COVID-19 news nor attention to COVID-19 information were associated with depression

whose only contact was through community and media channels [5, 6, 8••, 9, 10, 11•, 12]. Most of these studies were conducted in the community where the event occurred [5, 6, 8••, 9, 10]. One September 11 study was conducted in Seattle, WA, USA [12], far from the communities directly attacked. The study of the Sichuan earthquake was conducted in Chengdu, China, approximately 90 km from the epicenter of the earthquake [11•] (see Table 1).

Four of the five COVID-19 studies assessed participants in regions where public health restrictions were in place; none of these four studies described explicit measures of disaster exposure [7, 13, 14••, 16]. Murata et al. [15••] used a mixed recruitment strategy including a national online approach across the USA and advertisement through an academic healthcare center registry, outreach events, and patient portal. Their study, conducted at a time when some states were lifting public health restrictions, assessed various aspects of exposure including COVID-19 testing, quarantine, relationship with COVID-19 survivors and victims, and social distancing [15••] (see Table 1).

Media Forms and Extent of Contact

The pre-COVID-19 research assessed children's reactions to either television coverage alone [6, 10] or multiple media forms including television [5, 8••, 9] or did not specify the media form [11•, 12]. While several studies assessed internet or website contact [5, 8••, 9], none of the pre-COVID-19 studies specifically queried social media contact. In contrast, COVID-19 research examined various media forms including social as well as traditional media (see Table 1). The purpose of social media use (e.g., information gathering, socialization, entertainment) varied across studies. While most of the 12 studies measured the amount of media coverage consumed (e.g., amount of time, frequency of contact, proportion of all media contact), some studies assessed how much or how frequently participants reported learning about the event from the media [5, 8••, 9] or children's reaction to coverage [11•] instead. One COVID-19 study queried how much time participants spent browsing for information about coronavirus [13], and one asked about participants' attention to information about COVID-19 [16], but neither specified that these questions referred exclusively to media coverage (see Table 1).

Depression Outcomes

Of the 12 studies included in this review, four used a cutoff score to analyze probable post-event major depressive disorder in association with media contact [8••, 10, 11•, 16]. Others used depression symptoms in their media analyses [5, 6, 7, 9, 12, 13, 14••, 15••]. Four studies reported data

on pre-event depression symptoms [5, 6, 12, 14••] (see Table 1).

Pre-Event Depression

Aber et al. [5] found that pre-event baseline depression symptoms predicted slightly less media consumption after the September 11 attacks in their adolescent sample. In their study of Israeli children after a suicide bombing, Barile et al. [6] found relatively low levels of depression both pre- and post-event, with lower post-event than pre-event depression scores and no association between pre-event depression and media contact. In their distant sample of children assessed before and after the September 11 attacks, Lengua et al. [12] found that both child- and parent-reported depression decreased significantly at their first post-event assessment 2 weeks to 2 months after the September 11 attacks relative to the pre-event assessment and increased again at follow-up 6 months after September 11. They did not examine the association between media contact and pre-event depression and found no association between media contact and post-event depression [12]. Magson et al. [14••] found that depression increased during the COVID-19 pandemic relative to an earlier assessment; that both pre- and post-event depression were associated with COVID-19 social, but not traditional, media contact; and that change in depression was not associated with consumption of either COVID-19 traditional or social media coverage (see Table 1).

Associations Between Media Contact and Depression

The results of the pre-COVID-19 studies included in the current review were inconsistent with respect to the association between media contact and depression. Two terrorism studies found an association between probable major depressive disorder and media contact [8••, 10] while four studies found no association between depression symptoms and media contact [5, 6, 9, 12]. In their study of grief, depression, and posttraumatic stress in New York City children after the September 11 attacks, Geronazzo-Alman et al. [8••] found that major depressive disorder was associated with media variables in a model adjusted for grief and posttraumatic stress disorder (PTSD). The study of the Sichuan earthquake found that contact with frightening news content was associated with probable depression, while positive news messages protected against probable depression and suicidal ideation [11•] (see Table 1).

The COVID-19 studies also were inconsistent with respect to the association between media contact and depression. Li et al. [13] found that screen time, which was not defined, was not associated with depression symptoms, while browsing COVID-19 information for more than 2 h a day was

associated with depression symptoms. Among other studies that examined COVID-19 media consumption, one found that greater contact with COVID-19 media reporting was associated with greater risk for suicidal ideation or behavior [15••] and two found no association between COVID-19 news consumption and depression [7, 16]. Magson et al. [14••] found an association between depression symptoms and consumption of COVID-19 social media, but not COVID-19 traditional media, with no association between change in depression symptoms and contact with either media form. Of the other COVID-19 studies that examined social media contact [7, 15••], one found that both social media time and virtual time with friends were positively associated with depression symptoms [7] and one, which did not indicate the content of, or purpose for using, social media, found an association between social media and depression symptoms [15••] (see Table 1).

Methodological Review

The methodological rigor of the studies varied greatly. Most studies used cross-sectional design [7, 8••, 9, 10, 11•, 13, 15••, 16], with only four longitudinal studies that measured depression symptoms before and after the event [5, 6, 12, 14••]. Only two papers used probability sampling [8••, 10]. Children [5, 6, 7, 8••, 10, 11•, 13, 14••, 15••] or children and their parents [9, 12, 16] were the informants in all 12 studies. In the longitudinal September 11 study by Aber et al. [5], children and teachers were informants at the baseline assessment prior to the event, but only students reported on pre-event depression. As noted, eight studies used depression symptoms in the analysis of media contact [5, 6, 7, 9, 12, 13, 14••, 15••], while four used a clinical cutoff for depression [8••, 10, 11•, 16]. With respect to contact with various media forms, some studies examined only television coverage [6, 10], some used separate variables for each media form examined [7, 8••, 14••, 15••], others used a composite variable to examine more than one media form [5, 9, 16], and others did not specify the media forms examined [11•, 12, 13] (see Table 1). Further, many of the studies used only one or two media variables which varied considerably across the research, making it difficult to consolidate the results. None of the studies used depression measures that queried whether symptoms were related to the event or to coverage of the event.

Discussion

The inconclusive findings related to the association between media contact and depression across both pre-COVID-19 and COVID-19 studies align with the results of a recent

pre-pandemic meta-analysis that found no association between media contact and depression in children in the context of mass trauma [4••]. The study of depression in the context of mass trauma is complicated by a number of confounding factors that may influence the association—including those related to the mass trauma event and context, to aspects of the media coverage and contact, and to the children and their exposure—and by the relatively high prevalence of depression symptoms and major depressive disorder in the general population [17, 18]. This discussion considers these confounding factors, issues related to the measurement of depression outcomes, and causality.

Potential Confounding Factors in the Association Between Media Contact and Depression

Among potential confounding factors that may influence children's depression reactions to media coverage are characteristics of the event and context; aspects of media coverage and consumption; and the child's prior and/or subsequent experiences, psychiatric history, and event exposure. While not meant to constitute an exhaustive review, some of these factors are considered below along with methodological limitations in the extant research.

Characteristics of the Event and Context

A host of event characteristics (e.g., magnitude, probability) are likely to influence children's reactions to media coverage. In their meta-analysis of adult and child studies of depression outcomes associated with mass trauma media contact, Pfefferbaum et al. [4••] found a significant positive association between depression and coverage of specific incidents but not for chronic stressors (e.g., ongoing political conflict), perhaps because of the small number of studies of chronic situations. Of note, the Israeli study by Barile et al. [6] found no association between depression and media coverage of a suicide bombing in children, but the event occurred in the context of ongoing political violence and thus shared features of chronic stressors. It may be that specific aspects of enduring stressors or of media coverage and contact in these environments are responsible for these outcomes. For example, a recent review of Israeli child terrorism media studies found inconclusive results related to the association between media contact and a variety of psychological outcomes perhaps, in part at least, due to the nature of coverage in a region with a long history of political conflict [19]. Evidence suggests that media coverage in Israel typically delivers event-related information, political commentary, content on expected psychological reactions, and advice and support for mental health recovery [20]. The COVID-19 pandemic shares some characteristics with chronic political violence

including, among other things, the ongoing threat with no foreseeable end, intense media coverage, and societal effects that alter numerous aspects of daily life. COVID-19 coverage has been characterized by incomplete information, inconsistent messages, and copious misinformation often reflecting highly politicized agendas delivered by unqualified sources [21]. This coverage has generated confusion and sowed mistrust in government and public health authorities, likely influencing the reactions of many consumers. These considerations demonstrate the difficulties in identifying and examining contextual factors that influence the association between media contact and emotional outcomes.

Aspects of Media Coverage and Contact

A number of aspects of media coverage (e.g., content, images) and contact (e.g., media form, motivation for consumption, context) have the potential to influence the association between children's consumption and depression outcomes. Prior to the COVID-19 pandemic, television coverage was the predominant media form examined in the child disaster media literature. Children's use of social media has gained popularity over the years, but social media contact, as currently conceptualized, was seldom covered in pre-COVID-19 research with only three September 11 studies assessing depression in association with consumption of multiple media forms including internet and/or website contact [5, 8••, 9]. Driven by concern about the possible deleterious effects of increased screen time during extended home confinement in addition to concern about media content, COVID-19 studies examined numerous media forms including various social media platforms.

The pre-COVID-19 child mass trauma research generally used media contact variables linked to the event by querying event-related media consumption. As noted above, this was not universally true of the COVID-19 research assessing screen time [13] or social media [7, 15••] or internet [15••] use which did not query children's motivation for media consumption [7, 13, 15••]. The failure to distinguish media contact related to COVID-19 from contact for social, entertainment, or other purposes clouded the findings and seriously limited the interpretation of the results related to the association between media contact and depression. The inconclusive results regarding the association of media contact with depression are not surprising given the great diversity in questions used to assess media coverage and media consumption and the fact that some COVID-19 studies did not assess children's contact with consumption of media coverage focused on the pandemic. A discussion of the association between social media contact and depression in children in the context of mass trauma is beyond the scope

of this review. Such a review should consider, among other things, the multiple forms of social media and the diverse purposes of children's social media use, the various potential determinants of children's social media behavior, and both positive and negative outcomes associated with social media contact.

Participant Characteristics: Personal Vulnerabilities and Event Exposure

A host of individual factors, including demographic and vulnerability factors (e.g., prior psychiatric disorders, previous trauma exposure), influence children's disaster reactions and may also influence their reactions to media coverage. Vulnerability factors have not been well examined in the child disaster media literature. Of the four studies that assessed pre-event depression [5, 6, 12, 14••], only two examined its association with post-event media contact [5, 6]. One found that pre-event depression symptom severity predicted slightly less post-event media consumption [5] and one found no association between pre-event depression symptoms and post-event media contact [6]. The results of the COVID-19 study by Magson et al. [14••] suggested that the patterns of the associations between media contact and depression symptoms before and during the pandemic were similar (i.e., at both time periods, there was no association with traditional media contact but a positive association with social media contact) and that the pandemic did not influence the pattern of association between depression and media consumption. Future research should further examine pre-event depression and other child vulnerabilities that may influence the association between media contact and depression.

The mechanisms by which media contact affects children likely depend, in part at least, on their specific trauma experiences. A meta-analysis of posttraumatic stress reactions in adult and child terrorism media studies, which found a greater effect for media contact in studies of distant samples [22], suggested that media consumption may constitute a primary source of fear and other reactions in those who are not directly exposed to an event. In directly exposed children, media coverage may rekindle trauma memories and generate arousal, but personally experienced event trauma is likely to dwarf the influence of media coverage in determining the nature and degree of psychological outcomes. Evidence suggests that while directly exposed individuals are likely to develop posttraumatic stress, those with indirect exposure are more likely to experience depression [23•]. All of the studies included in the current review examined general population samples rather than samples of children selected because of their

particular personal involvement (e.g., direct exposure, interpersonal exposure). Unfortunately, none of the studies examined the influence of the child's event exposure on the association between media consumption and depression in the participating children. This issue should be addressed in future research.

The Depression Outcome

Studying depression in the context of mass trauma is complicated by a number of issues. First is the high number of cases of depression outside the context of mass trauma in general. Second are measurement issues involving the assessment of the prevalence and incidence of depression and the choice of diagnosis or symptoms as an outcome measure.

Depression Rates and the Assessment of Prevalence and Incidence

Most of the mass trauma media research fails to consider the fact that depression observed during or after a mass trauma may not be caused by the event and/or may even pre-date the event. Only four studies in this review reported pre-event depression measures [5, 6, 12, 14••]. Studies that examined pre-event depression symptoms suggest that it may have an effect on media behavior [5, 14••] though the findings regarding the association between pre-event depression and media contact were inconsistent [5, 6, 14••]. Magson et al. [14••] found that the change in depression scores from pre-pandemic to during the pandemic was not associated with media contact. Like most mass trauma media studies that have assessed post-event depression outcomes, none of the analyses distinguished between prevalence (i.e., the proportion of children with depression symptoms or depressive disorder during the post-event period) and incidence (i.e., the proportion of children who developed new depression symptoms or depressive disorder during the post-event period), making it impossible to determine if the depression outcomes were new since the event, and possibly caused by it, or if they were present before the event and thus represented relapses or ongoing symptoms or disorders rather than new symptoms or disorders.

Symptoms and Diagnosis

Like child disaster research on depression in general, most of the studies included in this review measured symptoms rather than diagnoses. Distress is ubiquitous in post-event settings, but, for most, it does not endure or develop into

psychiatric disorders. Thus, finding an association between media contact and depression symptoms, rather than a diagnostic outcome, may not be clinically meaningful.

Cause and Effect

Mass trauma events like those examined in the studies included in this review—the September 11 attacks, a suicide bombing in the context of ongoing political violence, a massive earthquake, and the global COVID-19 pandemic—affect large numbers of people with sometimes extensive and enduring community and societal effects. Depression symptoms are not unlikely following mass trauma given the many burdens and obstacles created by these events including personal and communal loss and trauma, property damage, disrupted services and support networks, and widespread distress. Children may turn to media coverage and/or social media to obtain information or to cope. Thus, studies that found an association between media contact and depression raise the issue of causation. It is possible that media consumption leads to depression or that depressed children seek media coverage or turn to social media. Concerns about the use of social media—particularly social media used for social connections—and the cause and effect issue were prominent during the extended period of home confinement in the COVID-19 pandemic. For example, depressed children may have used social media connections with friends to alleviate depression, thereby generating a positive association, or social media contact with friends may have lessened depression perhaps resulting in a negative association. Indeed, most of the extant research on the association between social media use and depression symptoms in youth has assessed correlations rather than establishing a causal relationship and has revealed inconsistent small associations that are not likely of clinical or practical significance [24].

Unlike PTSD, depression is not conditioned on exposure to trauma. Thus, symptoms need not be anchored in the event as reflected in the studies in this review, none of which asked participants if their depression symptoms were either related to or new since the event or to media coverage of the event. A link to trauma is not a required element in the assessment of depression, a subjectively reported link would not be conclusive in distinguishing prevalence and incidence, and an association between media contact and depression would not establish a causal relationship. Nonetheless, asking participants if they perceived their depression symptoms to be associated with the trauma or media coverage would provide useful information when assessing reactions to disaster media coverage. Thus, future research anchoring depression in the event and/or in media coverage of the event is warranted.

Conclusions

Relatively little empirical research has examined the association between media contact and depression in children in the context of mass trauma, with most studies examining terrorist events and the COVID-19 pandemic and only one natural disaster study. The review of this research, which yielded inconclusive results, highlighted the difficulties encountered in the study of media effects on depression. Taken as a whole, the extant literature, both pre-pandemic and COVID-19 publications, reported findings from research that was not focused primarily on media effects but examined media contact as a relatively minor consideration among other interests. Thus, the exploration of the topic was relatively superficial and left numerous issues unaddressed. Concern about children's increased screen time during COVID-19 pandemic restrictions generated studies to augment the relatively sparse disaster media effects literature on depression in children, but the new pandemic research has introduced additional theoretical and methodological complexities in the study of this topic. For example, while COVID-19 studies added a focus on social media contact, it raised questions about the purpose of social media use (e.g., to obtain and exchange information on COVID-19, to engage in social interaction, to be entertained) and about potential differences among various social media platforms as well as other factors related to individual children and the context of their media behavior. Future research specifically examining social media contact and depression in children in the disaster context and future reviews consolidating the results of this research are warranted.

Key among the complexities in the study of the association between media contact and depression is the relatively high prevalence of depression in the general population. Major mass trauma events and their secondary effects (e.g., disrupted services) tend to permeate the post-event environment, making it difficult to distinguish media contact and other channels of information and affect. The extant research has not established a causal relationship between depression and media consumption, raising the possibility that a number of factors may influence, or be the primary determinant of, the association. Furthermore, none of the studies included in this review was focused primarily on media effects, and all used a limited number of variables to examine aspects of media coverage and media consumption. These considerations serve as a reminder that multiple determinants interact to influence children's outcomes. Unfortunately, while some of these determinants have been identified, none has been adequately examined. The field would be well served by methodologically rigorous studies that focus specifically on the numerous intricate and dynamic media issues and on the many individual and contextual factors that influence the association between media consumption and depression.

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Compliance with Ethical Standards

Conflict of Interest Betty Pfefferbaum, Phebe Tucker, Pascal Nitiéma, Richard L. Van Horn, Vandana Varma, Yogesh Varma, Autumn Slaughter, and Elana Newman each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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