Addressing Child Mental Health Inequities Through Parental Mental Health and Preschool Attendance

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abstract

BACKGROUND: Prevention is key to reducing socioeconomic inequities in children's mental health problems, especially given limited availability and accessibility of services. We investigated the potential to reduce inequities for disadvantaged children by improving parental mental health and preschool attendance in early childhood.

METHODS: Data from the nationally representative birth cohort, Longitudinal Study of Australian Children ($N = 5107$, commenced in 2004), were used to examine the impact of socioeconomic disadvantage (0–1 year) on children's mental health problems (10–11 years). Using an interventional effects approach, we estimated the extent to which inequities could be reduced by improving disadvantaged children's parental mental health (4–5 years) and their preschool attendance (4–5 years).

RESULTS: Disadvantaged children had a higher prevalence of elevated mental health symptoms (32.8%) compared with their nondisadvantaged peers (18.7%): confounder-adjusted difference in prevalence is 11.6% (95% confidence interval: 7.7% to 15.4%). Improving disadvantaged children's parental mental health and their preschool attendance to the level of their nondisadvantaged peers could reduce 6.5% and 0.3% of socioeconomic differences in children's mental health problems, respectively (equivalent to 0.8% and 0.04% absolute reductions). If these interventions were delivered in combination, a 10.8% (95% confidence interval: 6.9% to 14.7%) higher prevalence of elevated symptoms would remain for disadvantaged children.

CONCLUSIONS: Targeted policy interventions that improve parental mental health and preschool attendance for disadvantaged children are potential opportunities to reduce socioeconomic inequities in children's mental health problems. Such interventions should be considered within a broader, sustained, and multipronged approach that includes addressing socioeconomic disadvantage itself.

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WHAT'S KNOWN ON THIS SUBJECT: Promoting parental mental health and children's preschool attendance are 2 known intervention opportunities to improve children's mental health. Evidence is scarce regarding the extent to which these intervention opportunities can in combination reduce socioeconomic inequities in children's mental health problems.

WHAT THIS STUDY ADDS: Promoting parental mental health and children's preschool attendance in combination will have more impact on children's mental health inequities than single intervention approaches. However, these interventions alone are not sufficient to close the socioeconomic gap in children's mental health problems.

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ARTICLE

Mental health problems are a significant public health concern and a leading cause of disease burden internationally.[1] It is estimated that 10% to 20% of children are affected worldwide,[2] with children from socioeconomically disadvantaged families being disproportionately impacted.[3] Reducing these inequities is a priority of governments internationally.[1] Evidence suggests only 9% to 27% of children aged 4 to 13 years with mental health problems access mental health services,[4] with barriers to access disproportionately impacting families experiencing socioeconomic disadvantage.[1] Although these barriers need to be addressed, this alone is unlikely to sufficiently reduce socioeconomic inequities in children's mental health.[5]

Children's mental health is shaped by the various environments in which they develop and heavily influenced by the social determinants of health.[5,6] Reducing children's mental health inequities will likely require a coordinated approach by stacking multiple complementary interventions across the various environments in which children grow and live over time.[7–9] Two major early environments that contribute to children's mental health, with existing policy interest and intervention platforms, are the family and early childhood education settings.[10,11] Evidence focusing on children's learning outcomes suggests that combining interventions across these environments may have more benefits than single intervention approaches.[7,12] Less is known about potential benefits for reducing children's mental health inequities.

In the family environment, socioeconomically disadvantaged children are more likely to have a parent experiencing poor mental health because of factors such as greater exposure to stressful life events,[13] which may in turn impact children's own mental health through parent-child interactions and parenting practices.[14] Improving the mental health of parents experiencing disadvantage may help to mitigate risks for their children.[13] A range of supports already exist for parents experiencing mental health problems. For example, in Australia the federal government has made significant investments in subsidizing costs for all families to access mental health professionals.[15] Although there are still barriers to access, adult mental health services are generally better resourced than children's services.[16] Trials of programs targeting mothers experiencing disadvantage, such as nurse home visiting, have also shown maternal mental health benefits.[17]

In the early education environment, preschool programs – structured, play-based education delivered by a qualified early childhood teacher – may help to mitigate the impact of socioeconomic disadvantage on children's mental health by providing positive emotional climates and responsive student-teacher relationships.[10] In the Australian context, since 2008, significant reforms have been delivered targeting service access and quality, with the aim of ensuring all children have access to 15 hours a week of quality preschool education in the year before school,[18] with social-emotional development being a priority.[19] Despite subsidized costs for disadvantaged families, children from these families have lower attendance rates compared with their nondisadvantaged peers.[18]

Evidence is scarce as to the extent to which improving parental mental health and preschool attendance in early childhood can reduce socioeconomic inequities in children's mental health (compared with generally improving children's outcomes). Alongside this is the need to understand how such early childhood intervention opportunities might operate as complementary strategies to reduce health inequities.[7,8] We draw on prospective data from the nationally representative birth cohort, Longitudinal Study of Australian Children (LSAC),[20] to simulate hypothetical interventions that improve both parental mental health and preschool attendance among socioeconomically disadvantaged children in early childhood. The findings show the benefits for children's mental health that could hypothetically be achieved if we could effectively leverage these 2 major intervention levers with existing policy interest and investment.

METHODS

Data Source

This study uses data from the Growing Up in Australia: LSAC birth cohort (B-cohort), a nationally representative sample of 5107 infants (51.2% male) that commenced in May 2004.[20] A complex survey design was used to select a sample that was broadly representative of all Australian children, except those living in remote areas. A range of information sources (ie, parent interviews and self-report questionnaires) were used to collect data on multiple aspects of child development as well as family characteristics. Responses were obtained from the child's primary caregiver, who was the biological mother in most cases (99.7%).

This paper draws on data collected when children were aged 0 to 1 year (Wave 1; n = 5107), 2 to 3 years (Wave 2; n = 4606; 90.2% retained), 4 to 5 years (Wave 3; n = 4386; 85.9% retained), 6 to 7 years (Wave 4; n = 4242; 83.1% retained), and 10 to 11 years (Wave 6; n = 3764; 73.7% retained).

Measures

Our conceptual model (Fig 1) shows the hypothesized causal pathways from family socioeconomic position (0–1 year) to children's mental health problems (10–11 years), via parental mental health and preschool attendance (4–5 years) as 2 intervention targets of interest, and baseline and intermediate confounders. Measures are briefly described below with full details in Supplemental File 1, Supplemental Tables 4 and 5. We also exmined an additional measure child mental health service use, descriptively. Although service use among children with elevated mental health symptoms would be another compelling mediator to explore, the measures of children's mental health problems were not sufficiently detailed to effectively adjust for confounding by indication, whereby children with more severe mental health conditions were more likely to have received a substantial level of mental health services (Supplemental File 2, Supplemental Tables 6–10).

Exposure

Family socioeconomic position at age 0 to 1 year was measured as a composite of each parent's self-reported annual income, highest education, and occupation level. Developers of this measure[21] used a standardization approach to create a continuous score with a mean of 0 and a SD of 1. In keeping with previous studies,[21] the 25% least socioeconomically advantaged families were categorized as "disadvantaged."

Mediators

Parental Mental Health (4–5 years)

The primary caregiver reported on her or his own mental health using the Kessler Screening Scale,[22] which is a measure of psychological distress with strong psychometric properties.[23] In keeping with previous studies,[24] children were classified as having a parent with "low psychological distress" if the parent scored 6 to 13 or "high psychological distress" if the total score was equal or above 14.

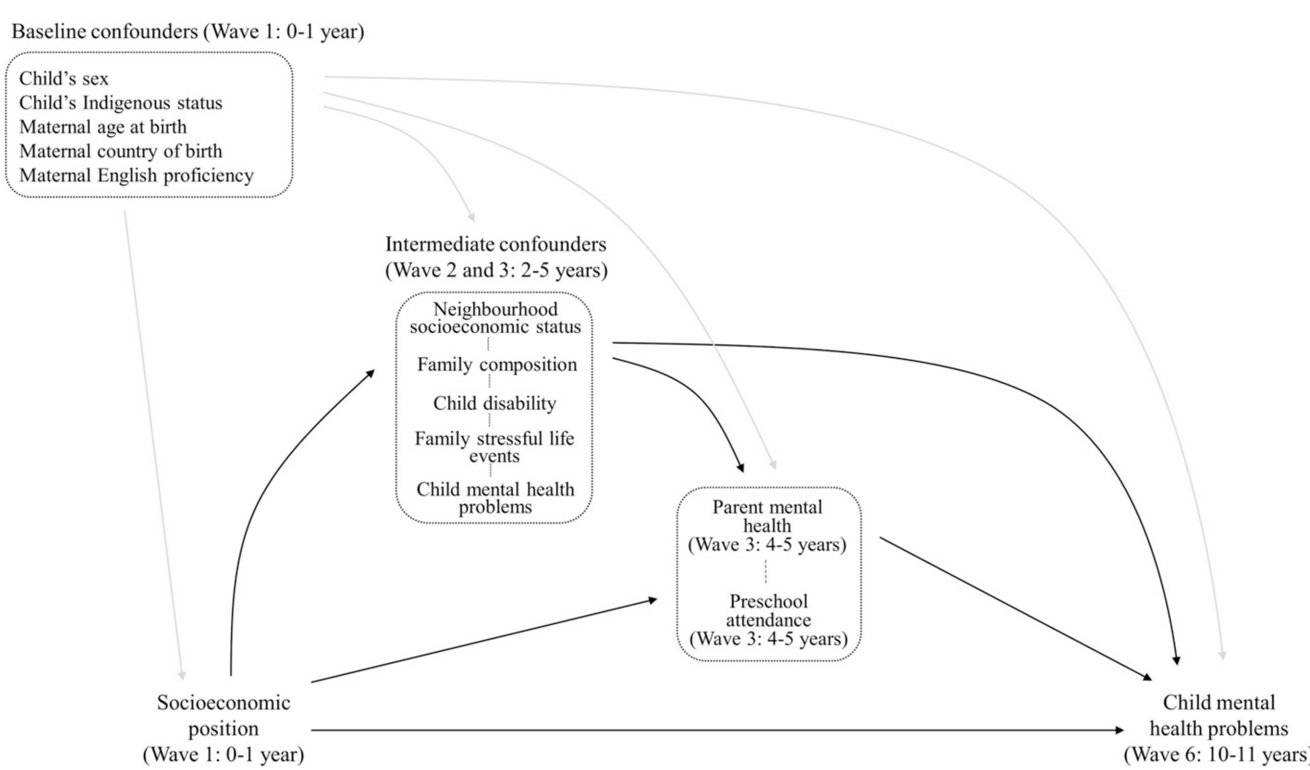

FIGURE 1
Directed Acyclic Graph (DAG) depicting the assumed causal model, conceptualizing the pathways from family socioeconomic position to child mental health problems, via the 2 mediators of interest (parental mental health and preschool attendance), and baseline and intermediate confounders. This model assumes that the 2 mediators are correlated with each other, but it does not make assumptions about directionality. Similarly for the intermediate confounders.

Preschool Attendance (4–5 years)

The primary caregiver reported on the child's attendance (yes or no) at a preschool program in the year before compulsory schooling. Children were classified as attending a preschool program if the primary caregiver reported current attendance at any setting (eg, stand-alone preschool, long day care center, within a school).

Outcome

Children's mental health problems at age 10 to 11 years were assessed using a parent-report version of the Strengths and Difficulties Questionnaire (SDQ) - a well-validated, 25-item screening measure of behavioral and emotional problems for 3 to 16 year olds.[25] Based on the Australian norms,[26] children were coded as having "elevated mental health symptoms" if their total score was on the 80th to 100th percentile.

Confounders

The following baseline and intermediate confounders were selected to reduce potential confounding bias in the estimation of the effects of interest. All confounders were dichotomized (Supplemental File 1, Supplemental Tables 4 and 5).

Baseline Confounders (0–1 year)

We posited 5 baseline confounders: child's sex, child's Indigenous status, maternal age at birth, maternal country of birth and maternal English proficiency. These variables were measured around the same time as the exposure and are thus not affected by the exposure. They are confounders of the following relationships: exposure-outcome, exposure-mediators, and mediators-outcome.

Intermediate Confounders (2–5 years)

We posited 4 intermediate confounders measured at 2 to 3 years (neighborhood socioeconomic status, family composition, child's disability excluding mental illness, and family stressful life events) and 1 intermediate confounder measured at 4 to 5 years (child mental health problems). These variables are affected by the exposure and are confounders of the mediator-outcome relationship.

Statistical Analysis

Participant characteristics were summarized overall and by family socioeconomic position using descriptive statistics. The proportion of children with missing data on any analysis variable was 49%. To reduce bias caused by missing data, multiple imputation by chained equations was conducted (See Supplementary File 3 for full details), producing 50 imputed datasets. All analyses were based on multiply imputed data for the full sample of 5107 participants. Analyses also accounted for the sample design, whereby clustering occurred via residential postcodes.

Preliminary analyses were first conducted to confirm whether the data were consistent with the expected associations depicted in Fig 1. Generalized estimating equations with an exchangeable correlation matrix, with adjustment for relevant confounders, were used to examine the associations between family socioeconomic position and children's mental health problems, between family socioeconomic position and each mediator (parental mental health and children's preschool attendance), and between each mediator and children's mental health problems (See Supplemental File 3, Supplemental Fig 2, Supplemental Table 11 for full details). Descriptive analyses, preliminary analyses, and multiple imputation were conducted using Stata 17.0.[27]

Interventional Effects Approach

Second, we used an interventional effects approach[28] as outlined by Moreno-Betancur et al[29] to examine the primary causal question of interest. That is, hypothetically, to what extent could we reduce socioeconomic inequities in children's mental health problems if we could offer effective interventions to promote parental mental health and preschool attendance among children experiencing socioeconomic disadvantage? Interventional effects approaches have been increasingly used in the health inequities literature.[12,30] The approach used in this study has been used and reported elsewhere,[12,30] and was specifically developed for contexts where data on actual, well-defined interventions already rolled out in the community are not available, or where existing data from interventions do not capture relevant populations or outcomes. Instead, the approach aims to demonstrate the hypothetical health benefit that could be achieved through developing effective interventions or maximizing existing interventions platforms. Simulation of hypothetical interventions requires more assumptions (Supplemental File 3, Supplemental Fig 2, Supplemental Table 11) than if we had data on actual interventions and these should be considered in the interpretation of the findings.[31,32]

Under this approach, we first estimated the confounder-adjusted absolute difference in the prevalence of elevated mental health symptoms at 10 to 11 years for children who were disadvantaged as compared with nondisadvantaged peers at 0 to 1 year, using g-computation – also known as regression-standardization.[33,34] Under a number of assumptions, including that the set of baseline confounders is a sufficient set for confounding adjustment, this adjusted difference provided an estimate of the socioeconomic disparity in mental health problems that we sought to reduce.

Using an extended g-computation estimation procedure,[29] we then examined the extent to which these disparities could be reduced by the following hypothetical interventions in children who were disadvantaged.

1. For each mediator, we considered an intervention that would shift the distribution of the mediator in children who were disadvantaged (the exposed group) to the levels in children who were not disadvantaged (the unexposed group). The effect of this intervention is the difference in prevalence of elevated mental health problems at 10 to 11 years before and after this intervention in children who were disadvantaged.
2. We considered an intervention that would shift the joint distribution of the mediators in children who were disadvantaged to the levels of their nondisadvantaged peers. The effect of this intervention is the difference in prevalence of elevated mental health problems at 10 to 11 years before and after this intervention in children who were disadvantaged. An estimate of this effect quantifies the benefit that could be achieved by considering both intervention targets together. This then allows estimation of the socioeconomic disparity in elevated mental health problems that would remain after intervening jointly on both mediators.

The interventions defined by the mediator shifts described above were considered a "pragmatic scenario," where the levels of parental mental health and preschool attendance in the nondisadvantaged (unexposed) group are used as a realistic benchmark for what might be achieved. A sensitivity analysis was also conducted to evaluate a "best-case scenario" based on a subset of the sample where the unexposed group was defined as children in the top 25% of socioeconomic position. This translates to a more ambitious intervention target of shifting mediator distributions in the most disadvantaged children (bottom 25% socioeconomic position) to levels in the most advantaged children (top 25% socioeconomic position).

Finally, we examined a "maximum benefit scenario," estimating the maximum benefit that could be achieved if all risk caused by the mediators were eliminated; that is, if all disadvantaged children had parents with low psychological distress and all attended preschool. As above, we estimated the reduction in socioeconomic disparity in elevated mental health problems that could be achieved by eliminating all risk caused by the 2 mediators independently and jointly. Further details on the analytic approach are provided in Supplemental File 3, Supplemental Fig 2, Supplemental Table 11. Analyses were implemented using R Statistical Software 3.5.1.[35]

RESULTS

Participant characteristics are summarized in Table 1. At 10 to 11 years, 21.4% of children had elevated mental health symptoms. A larger proportion of children from disadvantaged families experienced elevated symptoms compared with their nondisadvantaged peers (32.8% and 18.7%, respectively). At 4 to 5 years, a larger proportion of children from disadvantaged families had a parent experiencing high psychological distress (14.8% vs 8.5%), and fewer attended preschool (60.9% vs 69.3%), compared with children from nondisadvantaged families. In our sample (Supplemental File 2, Supplemental Tables 6–10), only a small proportion of children with elevated mental health symptoms accessed mental health services at 4 to 7 years, regardless of socioeconomic position (25.4% disadvantaged vs 30.7% nondisadvantaged).

Results from preliminary analyses confirming the expected associations depicted in Figure 1 are shown in Table 2. Notably, having a parent who experienced low psychological distress (odds ratio [OR] = 0.53; 95% confidence interval [CI], 0.39 to 0.73), and to a lesser extent attending preschool (OR = 0.81; 95% CI, 0.67 to 0.97), at 4 to 5 years were both associated with lower odds of elevated symptoms at 10 to 11 years, after adjusting for confounders and socioeconomic disadvantage. These findings provide support for the protective effects of parental mental health and preschool attendance for children's mental health outcomes.

Interventional Effects

Results from the interventional effects approach examining the main causal question of interest (Table 3) estimated an absolute difference of 11.6% (95% CI: 7.7% to 15.4%) in the prevalence of elevated mental health symptoms for socioeconomically disadvantaged children compared with their nondisadvantaged peers, after adjustment for confounders.

Under the pragmatic intervention scenario, this absolute difference in prevalence of elevated symptoms could be reduced by 0.8% through intervening to improve parental mental health, and a further 0.04% by intervening to improve preschool

TABLE 1 Descriptive Information for All Study Variables (n = 5107)

Variable	Observed Data, n	Frequency, n (%)	Socioeconomic Position, n (%)	
			Nondisadvantaged	Disadvantaged
Exposure, 0–1 y				
Socioeconomic position	5092			
Nondisadvantaged		3819 (75.0)	—	—
Disadvantaged		1273 (25.0)	—	—
Mediators, 4–5 y				
Parental mental health	3776			
Low psychological distress		3408 (90.3)	2763 (91.5)	640 (85.2)
High psychological distress		368 (9.8)	257 (8.5)	111 (14.8)
Preschool attendance	4385			
Attended preschool		2959 (67.5)	2378 (69.3)	575 (60.9)
Did not attend preschool		1426 (32.5)	1054 (30.7)	370 (39.2)
Outcome, 10–11 y				
Child mental health problems	3663			
No elevated symptoms		2881 (78.7)	2413 (81.3)	463 (67.2)
Elevated symptoms		782 (21.4)	555 (18.7)	226 (32.8)
Baseline confounders, 0–1 y				
Child sex	5107			
Female		2499 (48.9)	1864 (48.8)	625 (49.1)
Male		2608 (51.1)	1955 (51.2)	648 (50.9)
Child Indigenous status	5107			
No		4877 (95.5)	3739 (97.9)	1128 (88.6)
Yes		230 (4.5)	80 (2.1)	145 (11.4)
Maternal age at birth, y	5106			
≥27		4059 (79.5)	3304 (86.5)	747 (58.7)
<27		1047 (20.5)	514 (13.5)	526 (41.3)
Maternal country of birth	4997			
English speaking countries		4155 (83.2)	3095 (82.8)	1050 (84.3)
Non-English speaking countries		842 (16.9)	641 (17.2)	196 (15.7)
Maternal English proficiency level	5099			
Very good		4819 (94.5)	3669 (96.2)	1143 (89.9)
Good, not good, or not good at all		280 (5.5)	145 (3.8)	129 (10.1)
Intermediate confounders, 2–5 y				
Neighborhood socioeconomic status, 2–3 y	4606			
Nondisadvantaged		3395 (73.7)	2796 (78.69)	593 (56.8)
Disadvantaged		1211 (26.3)	757 (21.3)	451 (43.2)
Family composition, 2–3 y	4606			
2 parents		4126 (89.6)	3359 (94.5)	762 (73.0)
Lone parent		480 (10.4)	194 (5.5)	282 (27.0)
Child disability, 2–3 y	4601			
No disability		4239 (92.1)	3298 (92.9)	932 (89.5)
Disability		362 (7.9)	253 (7.1)	109 (10.5)
Family stressful life events, 2–3 y	3476			
≤2 stressful life events		2974 (85.6)	2453 (86.3)	515 (82.3)
>2 stressful life events		502 (14.4)	390 (13.7)	111 (17.7)
Child mental health problems, 4–5 y	3821			
No elevated symptoms		2973 (77.8)	2466 (80.8)	505 (66.2)
Elevated symptoms		848 (22.2)	587 (19.2)	258 (33.8)

Observed data are shown. —, not applicable.

attendance for disadvantaged children, making levels of each of these the same as for nondisadvantaged children. These estimates correspond to relative reductions in 6.5% and 0.3% of the socioeconomic disparity, respectively. Results from the sensitivity analysis (Supplemental File 4, Supplemental Tables 12–15) show that these estimates would only slightly increase under a best-case scenario where levels of parental mental health and preschool attendance among disadvantaged children were increased to be the same as for the most advantaged children (absolute reductions of 1.3% and 0.1% respectively).

Under the maximum benefit intervention scenario, we could potentially eliminate 1.8% of the

TABLE 2 Preliminary Analyses Showing the Estimated Association Between Socioeconomic Disadvantage, Parental Mental Health, Preschool Attendance, and Children's Mental Health Problems

	Model 1: Unadjusted, OR (95% CI)	Model 2: Adjusted for Baseline Confounders, OR (95% CI)	Model 3: Adjusted for Baseline and Intermediate Confounders, OR (95% CI)	Model 4: Adjusted for Baseline, Intermediate Confounders and Socioeconomic Disadvantage, OR (95% CI)
Association with children's elevated mental health symptoms				
Socioeconomic disadvantage	2.16 (1.80 to 2.59)	1.80 (1.48 to 2.20)	—	—
Parent with low psychological distress	0.33 (0.25 to 0.43)	0.34 (0.26 to 0.45)	0.53 (0.39 to 0.72)	0.53 (0.39 to 0.73)
Child attended preschool	0.69 (0.58 to 0.82)	0.72 (0.60 to 0.85)	0.80 (0.66 to 0.97)	0.81 (0.67 to 0.97)
Association with parent with low psychological distress				
Socioeconomic disadvantage	0.52 (0.41 to 0.65)	0.59 (0.46 to 0.75)	—	—
Association with child preschool attendance				
Socioeconomic disadvantage	0.73 (0.63 to 0.85)	0.83 (0.71 to 0.97)	—	—

Baseline confounders controlled for child's sex, child's Indigenous status, maternal age, maternal country of birth, and maternal English proficiency level. Intermediate confounders controlled for were neighborhood socioeconomic status, family composition, child's disability, family stressful life events and child's mental health problems. CI, confidence interval; OR odds ratio; —, not applicable.

absolute difference in prevalence of elevated symptoms if all disadvantaged children had parents with low psychological distress, and a further 0.6% if all disadvantaged children attended preschool. These estimates correspond to relative reductions in 15.5% and 4.9% of the socioeconomic disparity in children's mental health problems, respectively.

After intervening jointly on both parental mental health and preschool attendance, under the pragmatic scenario, disadvantaged children would still have a 10.8% (95% CI: 6.9% to 14.7%) higher prevalence of mental health problems compared with their nondisadvantaged peers after adjusting for confounding. Under the maximum benefit scenario, the remaining disparity in children's mental health problems after intervening jointly on both mediators would be 9.5% (95% CI: 4.5% to 14.5%).

DISCUSSION

This study examined the potential benefits of intervening on parental mental health and preschool attendance for reducing socioeconomic inequities in children's mental health problems. Our findings support the lasting impact of early socioeconomic disadvantage on children's mental health problems.[3,36] They also support the role of parental mental health and preschool attendance in shaping children's mental health.[10,14] Our simulation of hypothetical interventions suggests that promoting parental mental health, and to a lesser extent preschool attendance, among socioeconomically disadvantaged children in early childhood are opportunities to reduce some of the existing inequities in children's mental health problems. However, socioeconomic inequities remained.

Our findings are consistent with previous evidence showing that purposefully targeting disadvantaged children within the universal delivery of early years interventions (including early education and parent support) is associated with sustained positive effects.[37,38] However, few previous studies have specifically quantified the extent to which such interventions (alone or in combination) can reduce socioeconomic inequities in children's mental health, as was the purpose of this study. Our findings add to evidence on the benefits of "stacking" complementary interventions across the early years,[7,12,39] showing that the combined potential for our 2 early childhood interventions to reduce children's mental health inequities exceed that of either approach in isolation.

Findings from the pragmatic intervention scenario suggest the benefits of "leveling the field" in terms of disadvantaged children's parental mental health and preschool attendance (ie, making them similar to those of nondisadvantaged children) are small. Even with the maximum benefit intervention scenario, the reductions in children's mental health inequities are modest. Detecting any persisting effect over such a long timescale is noteworthy. In the "real world," these small reductions in health inequities could have larger impacts at the population level that we were unable to simulate.[9] Achieving these

TABLE 3 Results of Evaluation of Mediator Interventions to Reduce Socioeconomic Disparities in Children's Mental Health Problems Using the Interventional Effects Approach (Imputed Sample, $n = 5107$)

Effect	Estimate of Absolute Risk Reduction, %, (95% CI)	P	Proportion of Total Risk Reduction, Relative %	Remaining Disparities, %, (95% CI)
Total adjusted marginal risk difference	11.6 (7.7 to 15.4)	<.01	100.0	—
Scenario 1: a "pragmatic scenario" improving parental mental health and preschool attendance for disadvantaged children to the level of their nondisadvantaged peers				
Risk reduction from intervening on parental mental health	0.8 (−0.1 to 1.6)	.09	6.5	10.8 (7.0 to 14.6)
Risk reduction from intervening on preschool attendance	0.04 (−0.5 to 0.5)	.88	0.3	11.5 (7.6 to 15.4)
Risk reduction from intervening jointly on both mediators	0.8 (−0.2 to 1.8)	.13	6.7	10.8 (6.9 to 14.7)
Scenario 2: a "maximum benefit scenario" eliminating all mediators risk				
Risk reduction from intervening on parental mental health	1.8 (0.2 to 3.3)	.02	15.5	9.8 (5.7 to 13.8)
Risk reduction from intervening on preschool attendance	0.6 (−1.8 to 3.0)	.64	4.9	11.0 (6.4 to 15.6)
Risk reduction from intervening jointly on both mediators	2.0 (−1.1 to 5.2)	.21	17.5	9.5 (4.5 to 14.5)

Baseline confounders controlled for as appropriate were child's sex, child's Indigenous status, maternal age, maternal country of birth, and maternal English proficiency level. Intermediate confounders controlled for were neighborhood socioeconomic status, family composition, child's disability, family stressful life events, and child's mental health problems. CI confidence interval; —, not applicable.

simulated improvements in parental mental health and preschool attendance would also likely have synergistic immediate, long-term and intergenerational benefits beyond children's mental health.[9]

Consistent with previous findings,[4] only a small proportion of children in our sample who had elevated mental health symptoms accessed early mental health care, highlighting the need to complement mental health services with prevention opportunities targeting the social determinants of health.[40] Our findings highlight the challenge in making inroads on closing the socioeconomic gap, as opposed to generally improving children's developmental outcomes.[12] In the mental health context, socioeconomic disadvantage can impact children's mental health via a range of pathways, including the mediators we examined. Previous research has suggested that children's concurrent circumstances, as opposed to their more distal earlier childhood experiences, could also have a stronger influence on their mental health outcomes in late childhood.[41] Therefore, any limited number of interventions alone, targeting single developmental periods, are unlikely to fully redress socioeconomic inequities in children's mental health.

Strengths and Limitations

Using prospective, longitudinal data from a nationally representative sample of children in Australia is likely to increase the generalizability of our findings. However, children from the most disadvantaged families were likely to be lost to follow-up because of difficulties engaging with these families. Although we used multiple imputation to reduce the potential for selection bias arising from missing data caused by attrition, it is possible that biases remain.

The real world interventions capable of achieving the defined improvements in parental mental health and preschool attendance remain ill-defined. The issue of poorly defined interventions is a pervasive problem in social epidemiology, which has led a push for approaches such as the one used here that explicitly recognize and think through the implications for the development of actual interventions in the future.[42]

There are some limitations of our data that should be noted. In measuring children's mental health, we used a parent-reported screening tool (SDQ). Although this allowed us to capture the broader spectrum of mental health problems experienced by children, we were unable to examine the intersection of these difficulties with clinical diagnoses (not available in LSAC). The measures used to define the 2 interventions of interest were also somewhat blunt. For example, because of lack of detailed data, we were unable to consider the nature of parental mental health problems (eg, types and duration) or the amount of preschool attendance (eg, days per week, number of years attended). These factors may differ between disadvantaged and nondisadvantaged children, and inability to measure these may have led us to underestimate the effects of our hypothetical interventions.

Finally, we accounted for a range of baseline and intermediate confounders, which is not common in causal mediation analysis because most approaches cannot incorporate multiple mediators, including such intermediate confounders.[43] Nevertheless, it is possible that residual confounding may have biased our estimates.

Implications

Our findings suggest that promoting parental mental health and preschool attendance are promising opportunities, this study cannot address the practicalities of real-life implementation. Further research and policy efforts are needed to understand how existing policies, resources, or intervention programs can be leveraged to achieve and exceed the effects observed in this study. Maximum impact on child mental health inequities will likely require a multisectoral and sustained strategy, stacking diverse types of complementary interventions over childhood, including those addressing disadvantage itself (eg, family income support), together with strategies such as improved parental support and preschool provision.[7,9] Combining universal services such as preschool programs and adult mental health system with more intensive and targeted support for children experiencing disadvantage is also increasingly recognized as essential for reducing inequities.[44] The onus is on researchers to identify and test the most promising intervention opportunities (eg, through data modeling and interventional trials) and deliver the robust level of evidence needed to inform a coordinated stacked policy approach that can collectively drive systems toward more equitable child outcomes.

Interventional effects analyses present an innovative option for examining a range of other intervention opportunities, and potential optimal combinations of interventions, for reducing inequities in children's mental health. This includes interventions targeting other aspects of parental mental health and preschool (eg, type and quality of preschool programs attended). Other opportunities may also lie in examining the combined potential of both prevention (such as the interventions we examined) and early intervention opportunities (eg, access to child mental health services) for reducing children's mental health inequities.

CONCLUSIONS

This study used high-quality prospective, longitudinal data and cutting-edge modeling approaches to estimate the combined impact of improving parental mental health and preschool attendance on children's mental health inequities. The incrementally small (but potentially important at the population level) benefits suggest that although these interventions alone are insufficient to fully close the gap, they highlight the importance of considering multiple and concurrent policy levers to address inequity.

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ABBREVIATIONS

CI: confidence interval
DAG: directed acyclic graph
LSAC: Longitudinal Study of Australian Children
OR: odds ratio
SDQ: Strengths and Difficulties Questionnaire

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