

The effect of parental leave on parents' mental health: a systematic review

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Mental health disorders during the post-partum period are a common morbidity, but parental leave might help alleviate symptoms by preventing or reducing stress. We aim to summarise available evidence on the effect of different types of parental leave on mental health outcomes among parents. For this systematic review, we searched Ovid MEDLINE, Web of Science, PsycINFO, CINAHL, and Scopus from database inception to Aug 29, 2022, for peer-reviewed, quantitative studies written in English. We included studies if the exposure was postnatal parental leave; a relevant comparison group was present (eg, paid vs unpaid leave); and if indicators related to general mental health, including depression, anxiety, stress, and suicide, for either parent were evaluated or recorded at any time after childbirth. The Review is registered with PROSPERO (registration number CRD42021227499). Of the 3441 records screened, 45 studies were narratively synthesised. Studies were done in high-income countries, and they examined generosity by any parental leave (n=5), benefit amount (n=13), and leave duration (n=31). 38 studies were of medium or high quality. Improved mental health was generally observed among women (referred to as mothers in this Review) with more generous parental leave policies (ie, leave duration and paid vs unpaid leave). For example, increased duration of leave was generally associated with reduced risk of poor maternal mental health, including depressive symptoms, psychological distress and burnout, and lower mental health-care uptake. However, the association between fathers' leave and paternal mental health outcomes was less conclusive as was the indirect effect of parental leave use on partners' mental health.

Introduction

The transition to parenthood can be stressful as it denotes a major life change that occurs in a short timeframe. Women (herein referred to as mothers) experience biological changes and carry the physical burden due to pregnancy and childbirth, whereas both parents experience many challenges related to child rearing, career uncertainties, and financial pressures because of time off work and reduced income.¹ These stressors might exacerbate or trigger mental health problems, including common mental health disorders (eg, depression and anxiety) and other psychiatric outcomes in the post-partum period² and beyond.^{3,3} Globally, the prevalence of common mental health disorders in the post-partum period ranges from 10% to 20% among mothers² and up to 10% among fathers.⁴ Left untreated, these disorders form a substantial economic burden, estimated at US\$14 billion for births in 2017 (up to 5 years post partum), in the USA alone.⁵

Parental leave is defined as job-protected leave of absence for employed parents after childbirth to take care of their baby.⁶ Parental leave might help alleviate mental health symptoms by preventing or reducing stress associated with childbirth and infancy.⁷ For example, parental leave could help the mother to recover from pregnancy and childbirth and extend breastfeeding duration, which in turn might encourage bonding with the infant.⁸ Moreover, paid parental leave enables both parents to maintain their labour market attachment through job protection while supporting a more equitable work-life balance in the household,⁹ with potential implications for their stress levels.

Guided by the Health in All Policies¹⁰ approach, which considers health consequences across all public policies,

the aim of this systematic review was to examine international evidence on the association between parental leave and mental health among parents. Specifically, the objectives were to assess whether access to parental leave and parental leave generosity by payment and duration are associated with parents' mental health outcomes.

Methods

Search strategy and selection criteria

This systematic review was done following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines^{11,12} (appendix pp 2–6) and prospectively registered in PROSPERO (registration number CRD42021227499). Deviation from the protocol is detailed in the appendix (p 7).

We developed the search strategy in consultation with a librarian at the Karolinska Institutet (Stockholm, Sweden). We searched five electronic databases—Ovid MEDLINE, Web of Science, PsycINFO, CINAHL, and Scopus—for peer-reviewed studies published until Aug 29, 2022, with no date limits. Studies were eligible for inclusion (1) if the exposure was postnatal parental leave, defined either as paid or unpaid postnatal parental (maternity, paternity, or family) leave, or as time off work after childbirth; (2) if a relevant comparison group was present (eg, eligibility for parental leave [yes vs no], reimbursement of parental leave [paid vs unpaid], and different lengths of parental leave); and (3) if indicators related to general mental health, including depression, anxiety, stress, substance use, disordered eating behaviours, self-injury, and suicide, for either parent were assessed or reported at any time after childbirth. Outcomes included self-reported measures, symptoms

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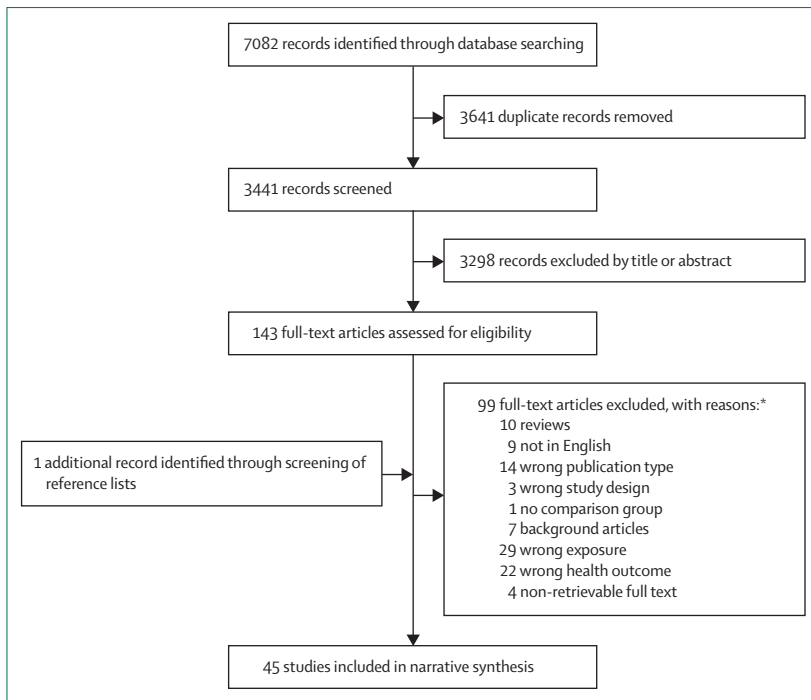


Figure: Study selection

*Excluded references are provided in the appendix (pp 24–27).

and diagnoses, validated and unvalidated instruments, health-care proxies, and mental health-related mortality. In this systematic review, we kept outcome measures deliberately broad to include all potential mental health outcomes described in the literature. Search strings created with keywords are detailed in the appendix (pp 8–15). The review included only quantitative studies, including observational, quasi-experimental, and mixed-method study designs, and excluded qualitative studies, grey literature, and studies not written in English.

After duplicates were removed, studies were imported to Rayyan QCRI. Two reviewers (AH, and SPJ or HH) independently screened titles and abstracts and assessed full-text articles to establish eligibility for inclusion. A third reviewer (HH or SPJ) was consulted for discrepancies.

Data analysis

One reviewer (AH or HH) extracted information using a piloted standardised Excel spreadsheet, which was then validated by a second reviewer (SPJ, HH, or AH). Extracted data included information on study characteristics (study design, methods, and sampling frame), sample characteristics (sample size, age, sex, socioeconomic factors, and race or ethnicity), exposure and outcome measures, and statistical analyses (analytical approach, effect measure, confidence interval and standard error, and adjustment variables). Data are available on request.

The risk of bias assessment was done by two independent reviewers (AH, and SPJ or HH) by use

of two modified quality assessment tools: the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practise Project (appendix pp 16–19), for quasi-experimental designs,^{13,14} and the Newcastle–Ottawa Quality Assessment Scale for cohort (appendix p 20) and cross-sectional studies (appendix p 21), for observational designs.¹⁵

The analytical approach of the systematic review was a narrative synthesis of all included studies, which followed the Synthesis Without Meta-analysis (SWiM) reporting guideline.¹⁶ Studies were grouped by parent type (ie, mothers and fathers) for both the exposure and outcome, type of parental leave measure (any leave, amount of benefit payments, and leave duration), study design, and further considered by study quality. Studies were narratively synthesised by use of tabulation and vote counting based on direction of effect, comparing more generous parental leave schemes with less generous ones on the basis of leave type, generosity of benefit payment (paid vs unpaid), and duration. With regard to length of leave, we compared studies reporting findings associated with similar length of leave; for example, leave up to 6 weeks, 2 months, and 3 months, and leave operationalised as a continuous variable.

Results

The search identified 7082 records (figure). After removing 3641 duplicates and excluding 3298 articles in the title and abstract screening, we assessed 144 full-text articles for eligibility, including one record identified from searching the reference lists of included articles. 99 articles did not meet the inclusion criteria, which led to 45 articles being included in the systematic review (table 1; appendix pp 22–49).^{17–61}

17 studies were based on a quasi-experimental design,^{17–23,26,27,29,31,36,37,40,44,48,61} including six uncontrolled before–after studies,^{19–21,36,37,61} six controlled before–after studies,^{18,22,23,31,40,44} two cohort studies,^{27,29} and three cross-sectional studies.^{17,26,48} 28 studies were observational,^{24,25,28,30,32–35,38,39,41–43,45–47,49–60} including 15 cohort studies^{25,30,34,35,39,41,42,45,47,49–51,53,56,60} and 13 cross-sectional studies.^{24,28,32,33,38,43,46,52,54,55,57–59} 38 studies were of medium or high quality. The risk of bias assessment is summarised in the appendix (pp 50–54).

Studies were done in Australia,^{21,36,60} Canada,^{19,30} Chile,¹⁷ Denmark,²⁰ Europe,¹⁸ France,⁵⁶ Germany,⁵³ Ireland,⁵² Japan,^{49,61} Norway,²³ Sweden,^{37,45,47,55} and the USA.^{22,24–29,31–35,38–44,46,48,50,51,54,57–59}

Most studies examined parents aged between 18 years and 40 years. The study participants were selected from established cohort or longitudinal studies,^{17–19,21–23,26–29,31,34,35,39–44,46,47,49,51,53,60} administrative databases or registers,^{20,23,33,36,37,48} an online survey,⁶¹ social media,^{24,25} health-care centres,^{25,45,50,52,55} or hospitals,^{30,38,54,56} or recruited from specific populations, such as active army personnel⁵⁷ and medical junior doctors.^{32,58,59} The same data sources were used in different studies:

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|---|---|--|---------------------------|--|--|--|---|
| Quasi-experimental studies | | | | | | | |
| Albagli et al (2019) ¹⁷ | Chile Early Childhood Longitudinal Survey | 2012 | Cross-sectional | Mothers to children born between Sept 1, 2009, and Dec 31, 2011 (children aged 7 months to 6 years in 2012) | Maternity leave extension, introduced on Oct 17, 2011; paid maternity leave increased from 12 weeks to 24 weeks for all mothers of children born on or after July 25, 2011, and more than 12 weeks but less than 24 weeks for mothers of children born between May 2, 2011, and July 15, 2011 | Eligibility for paid parental leave extension: fully exposed group (mothers who gave birth on or after July 25, 2011) vs partly exposed group (mothers who gave birth between May 2, 2011, and July 25, 2011) vs non-exposed group (mothers who gave birth before May 2, 2011) | Maternal stress (measured 7 months to 6 years after childbirth) |
| Avendano et al (2015) ¹⁸ | Denmark, Austria, France, Germany, Belgium, Spain, and Italy Survey of Health, Ageing and Retirement in Europe, linked to the Comparative Maturity, Parental and Childcare Leave and Benefits Database | Different data collection periods: 2004–05, 2005–06, and 2008–09 | Controlled before–after | Women aged >50 years who gave birth to their first child at age 16–25 years | Not stated | Eligibility for paid maternity leave, by duration and generosity; pre-reforms vs post-reforms, and in employment in the period around the birth vs not in employment in the period around the birth | Depressive symptoms in older women (measured >50 years after childbirth) |
| Baker and Milligan (2008) ¹⁹ | Canada National Longitudinal Study of Children and Youth | 1998–2003 | Uncontrolled before–after | All children born between 1998 and 2003; excludes children from single-parent families, from Quebec, and if the father was the survey respondent | Canada parental leave reform, introduced on Dec 31, 2000; before the reform, paid leave was 15 weeks for mothers plus 10 weeks of paid leave that could be divided between the mother and the father (ie, total of 25 weeks of paid leave); after the reform, paid leave for parents of children born on Dec 31, 2000, or later, increased by 25 weeks, so 35 weeks could be divided between the parents, thus mothers were entitled to up to 50 weeks of paid leave; the reform also decreased the number of employment hours from 700 h to 600 h to be eligible for paid parental leave; to be eligible, the parent should have 600 h of paid employment during the 12-month period before the date of the claim | Eligibility for paid parental leave extension: pre-reform vs post-reform | Maternal depression (measured 7–12 months and 13–24 months post partum); absence of maternal post-partum depression (measured 7–12 months and 13–24 months post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome | |
|-------------------------------------|-------------|--|--|---------------------------|---|--|--|--|
| (Continued from previous page) | | | | | | | | |
| Beuchert et al (2016) ³⁰ | Denmark | Total population registers | Nov 2, 2001–March 1, 2002 | Uncontrolled before–after | All births from mother–father partnerships from 60 days before Jan 1, 2002, and 60 days after Jan 1, 2002, considering only births from mothers who were eligible for maternity leave benefits; excluded births where multiple fathers or mothers were registered | Parental leave extension, introduced on March 27, 2002; before the reform, mothers were eligible to full benefit payment for 24 weeks (14 weeks of maternity leave and 10 weeks of shared leave) and 60% of benefit compensation for 52 weeks; after the reform, mothers were eligible to full benefit payment for 46 weeks (14 weeks of maternity leave and 32 weeks of shared leave); mothers who gave birth between Jan 1 and March 26, 2002, could choose between pre-reform or post-reform options | Eligibility for paid parental leave extension; pre-reform vs post-reform | Mother admitted to hospital with depression within 1 year and within 3 years post partum; mother receiving antidepressants within 1 year and within 3 years post partum; mother admitted to hospital for mental and behavioural disorders within 1 year and within 3 years post partum; mother receiving outpatient treatment for mental and behavioural disorders within 1 year and within 3 years post partum; mother receiving antidepressants (Anatomical Therapeutic Chemical code N06A) within 1 year and within 3 years post partum |
| Bilgrami et al (2020) ³¹ | Australia | Household, Income, and Labour Dynamics in Australia Survey | 2004–10 (pre-reform) and 2012–16 (post-reform) | Uncontrolled before–after | Women eligible to paid parental leave who gave birth before and after the Paid Parental Leave reform scheme; thereafter, a subsample of partners eligible for paid parental leave (married, registered, or de facto) after the introduction of the complementary Dad and Partner Pay reform in 2013 | (1) Paid Parental Leave scheme, introduced on Jan 1, 2011; the Paid Parental Leave scheme entitled parents to up to 18 weeks of paid leave at the national minimum full-time wage (approximately 42% of the average employment and income history of the primary carer; the parent must have worked at least 330 h in 10 months of the 13 months before childbirth, with no more than an 8-week gap, translating to just more than a full day of work per week (8 h per week); the parent must have an adjusted taxable income of \leq A\$150000 in the financial year before childbirth; and the parent must take leave from the time when one becomes primary carer until the end of the parental leave period; (2) Dad and Partner Pay scheme, introduced in 2013; partners eligible for paid parental leave (married, registered, or de facto) are eligible to the Dad and Partner Pay scheme; the scheme has the same eligibility criteria as the Paid Parental Leave scheme and is paid for up to 2 weeks at the national minimum wage | Eligibility for paid parental leave: before the Paid Parental Leave scheme (unpaid leave) vs after the Paid Parental Leave scheme; eligibility for paid paternity leave: before the Dad And Partner Pay scheme vs after the Dad And Partner Pay scheme | Maternal mental health (measured up to 12 months post partum); maternal depression severity (measured up to 12 months post partum); mother “feeling down” ⁷² ; mother dumps nothing could cheer you up ⁷³ ; or mother “feeling calm and peaceful” ⁷³ (measured up to 12 months post partum) |

(Table 1 continues on next page)

two studies used data from the Early Childhood Longitudinal Survey—Birth Cohort,^{27,46} two studies used data from the National Health Interview Survey,^{31,40} two studies used data from the Listening to Mothers III survey,^{41,43} and three studies used data from the Wisconsin Maternity Leave and Health Project.^{28,39,42}

Parental leave was defined as job-protected time off work after childbirth (table 2), which includes parental (family), maternity, and paternity leave. Parental leave is typically gender neutral and available to both parents, whereas maternity leave is for mothers and paternity leave for fathers. Nonetheless, studies often refer to maternity or paternity leave despite the fact that some countries included in the studies have a gender-neutral policy (eg, Sweden and the USA).

With regard to outcomes, depressive symptoms established via validated scales or self-reported data, depression, or hospital admission for depression were examined in 27 studies.^{18,21,25–30,32–34,39,41–43,46,49–52,54–60} Other mental health outcomes included psychological distress,^{31,40,44,60} stress,^{17,20,24,25,41,45,51,61} burnout,^{24,32,58,59} anxiety,^{33,39,42,50} general mental health,^{21,29,35,36,48,53} use of mental health care,⁴¹ inpatient and outpatient hospital admissions for mental and behavioural disorders,^{20,37} antidepressant use,²⁰ suicide,⁴⁷ and various self-reported symptoms of mental health.^{21,22} Most studies^{17,19–23,25–46,48–61} examined the association between parental leave and mental health during the post-partum period, generally up to 3 years post partum. One study investigated the risk of paternal suicide 3–20 years after childbirth⁴⁷ and two studies explored mental health outcomes in older women (aged >40 years).^{18,23}

No study assessed whether schemes introducing parental leave in general, relative to no parental leave, influenced maternal mental health, and no study compared maternal uptake of any parental leave with no parental leave.

Compared with unpaid leave schemes, the introduction of paid parental leave schemes was generally associated with improved maternal mental health in the post-partum period.^{21,22,31,36,40,44} In Australia, quasi-experimental studies found improved general mental health³⁶ and reduced depression risks²¹ among mothers eligible for both paid and unpaid leave compared with mothers only eligible for unpaid leave. After the establishment of paid leave in California^{22,31,40,44} and New Jersey,⁴⁰ USA-based quasi-experimental studies noted reduced risks of psychological distress^{31,40,44} and improved mental health²² among resident mothers compared with mothers living in states that did not provide paid leave or that were under pre-reform conditions, thus providing only federal unpaid leave.

Observational evidence of an association between mothers' parental leave benefits and maternal mental health outcomes showed mixed findings. In the USA, one study showed that, among women being on leave for a similar duration, women who received paid leave had

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|------------------|--|---|-------------------------|--|---|--|---|
| California (USA) | National Survey of Children's Health | 2003 (pre-reform) and 2007 (post-reform) | Controlled before–after | Infants from the National Survey of Children's Health aged <2 years and their parents | California Paid Family Leave, introduced on July 1, 2004; the California Paid Family Leave allows employees up to 6 weeks of paid leave (55% of average salary up to a maximum amount per week) if they have been employed during the year before the child's birth and earned at least US\$300 to care for a neonate or adopted child or a seriously ill family member; the California Paid Family Leave together with the Family and Medical Leave Act provides job protection to eligible employees | Eligibility for paid parental leave: before the California Paid Family Leave (2003) vs after the California Paid Family Leave (2007) | Parental mental health (measured <2 years post partum); parental emotional health (measured <2 years post partum) |
| Norway | Total population registers, the Cohort of Norway, and the National Health Screening Service's Age 40 Program | 1977; sub-analyses in 1975, 1978, and 1979; follow-up from 1988 to 2003 (approximately at age 40 years) | Controlled before–after | Mothers who gave birth in 1977, were observed in either the Cohort of Norway or the National Health Screening Service's Age 40 Program data, and who earned at least kr10 000 in the calendar year before giving birth; sub-analyses included women who gave birth in nearby non-reform years (1975, 1978, and 1979) | Norway paid maternity leave, introduced on July 1, 1977; the Norway paid maternity leave entitles mothers to 18 weeks of paid leave at 100% of earnings with job protection before and after childbirth; 6 weeks of 18 weeks had to be taken by the mother, and the remaining weeks could be shared between the parents; the reform also increased unpaid job-protected leave for up to 1 year; for eligibility, women had to earn at least kr10 000 annually and work at least 6 of 10 months immediately before childbirth; before the reform, eligible mothers were entitled to up to 12 weeks of unpaid leave | Eligibility for paid parental leave, by duration and generosity: pre-reform (unpaid only) vs post-reform (paid and extended leave) | Maternal self-reported mental health (measured approximately 40 years after childbirth) |

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| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|--|---|--|-----------------|---|--|--|--|
| (Continued from previous page) Chatterji and Markowitz (2005) ²⁶ | USA National Maternal and Infant Health Survey | 1988 | Cross-sectional | Women aged >18 years who had worked at any time during pregnancy and who had returned to work by the time the infant was aged 6 months, but younger than 24 months at the time of the survey | State-level maternity leave policies; by 1990, 30 US states had maternity or parental leave laws, including leave for the mother only, recovery from childbirth, and parent taking a year off to look after the infant | Eligibility for and uptake of maternity leave, by duration: leave (0–6 months; as a continuous variable); instrumental variables: (1) whether the state had any unpaid, job-protected maternity leave law in 1988, which applied to private-sector workers, not just state employees (states with salary replacement laws are excluded here), (2) an interaction term between this maternity leave law and the number of weeks of unpaid leave was provided by the law, and (3) whether the state had a temporary disability law in 1988, which would provide some degree of salary replacement for non-work-related disabilities, including pregnancy-related conditions and childbirth | Maternal depressive symptoms (measured approximately 17 months post partum) |
| Chatterji and Markowitz (2012) ²⁷ | USA Early Childhood Longitudinal Survey—Birth Cohort | 2001–02; follow-up with a survey 9 months post partum, varying from 6 months to 22 months) | Cohort | Mothers who had worked (part time or full time) during pregnancy, had returned to work by the time of the interview (approximately 9 months post partum, varying from 6 months to 22 months), and whose child (biological or adoptive) was born in 2001; however, mothers who stated that they did not take maternity leave as they resigned from their job during pregnancy but returned to work were excluded, as were mothers who stated that their maternity leave length was more than 6 weeks shorter than the child's age when they returned to work | Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Eligibility for and uptake of paid and unpaid maternity leave, by duration: <12 weeks of total leave vs ≥12 weeks of total leave, and <8 weeks of paid leave vs ≥8 weeks of paid leave; instrumental variables: local labour market conditions, cost of child care, and state policies related to maternity leave | Maternal depressive symptoms (measured approximately 9 months post partum, varying from 6 months to 22 months) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|-----------------------------------|--|-------------|-------------------------|---|--|---|--|
| (Continued from previous page) | | | | | | | |
| Dagher et al (2014) ²⁹ | Minnesota (USA) Maternal Postpartum Health Study | 2001 | Cohort | English-speaking women aged >18 years who had been continuously employed for at least 20 h per week for 3 months in the year before childbirth, who intended to return to work after childbirth, and who gave birth to a healthy infant (≥32 weeks of gestation, birthweight >1500 g) | (1) Minnesota Parental Leave Act, introduced in 1987; the Minnesota Parental Leave Act provides 6 weeks of unpaid, job-protected parental leave to care for a neonate or adopted child for employees who work for an employer with >21 employees; the employee must have worked (part-time or full-time) for 12 consecutive months before requesting leave; the employer must reinstate the benefits received before the employee's leave; (2) Minnesota At-Home Infant Care programme, introduced in 1997; the Minnesota At-Home Infant Care programme provides partial wage replacement (up to 90% of Minnesota's maximum rate to a licensed family child-care provider who provides full-time infant care) for eligible parents whose income is below 175% of the federal poverty level to stay at home and care for their child until the child is age 1 year; eligible parents include those working, seeking employment, or studying in the 9 months before their application; only one parent can qualify for the programme; and (3) Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Eligibility for and uptake of paid, unpaid, or paid and duration: leave (as a continuous variable); instrumental variables: maximum available duration of all paid parental leave and maximum available duration of all job-protected leave | Maternal post-partum depressive symptoms (measured 6 weeks to 12 months post partum); maternal mental health (measured 6 weeks to 12 months post partum) |
| Doran et al (2020) ³¹ | California (USA) National Health Interview Survey | 2000–10 | Controlled before–after | Mothers with children younger than 12 months | California Paid Family Leave, introduced on July 1, 2004; the California Paid Family Leave allows employees up to 6 weeks of paid leave (55% of average salary up to a maximum amount per week) if they have been employed during the year before the child's birth and earned at least US\$300 to care for a neonate or adopted child or for a seriously ill family member; the California Paid Family Leave together with the Family and Medical Leave Act provides job protection to eligible employees | Eligibility for paid parental leave: mothers with infants in California (before and after intervention) vs mothers with infants in 35 other states without parental leave (before and after intervention) | Maternal post-partum psychological distress (measured up to 12 months post partum) |

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| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|---------------------------------------|---|---|---------------------------|---|---|---|---|
| (Continued from previous page) | | | | | | | |
| Hewitt et al (2017) ³⁶ | Australia Two unnamed surveys | November, 2010–February, 2011 (before paid parental leave) and October–December, 2012 (after paid parental leave) | Uncontrolled before–after | Australian mothers who had a baby in October or November, 2009 (before the Paid Parental Leave scheme) and Australian mothers who were eligible or had applied for paid parental leave and who gave birth in October or November, 2011 (after the Paid Parental Leave scheme) | Paid Parental Leave scheme, introduced on Jan 1, 2011; the Paid Parental Leave scheme entitled parents to up to 18 weeks of paid leave at the national minimum full-time wage (approximately 42% of the average employment and income history of the primary carer; the parent must have worked at least 330 h in 10 months of the 13 months before childbirth, with no more than an 8-week gap, translating to just more than a full day of work per week (8 h per week); the parent must have an adjusted taxable income of ≤A\$150 000 in the financial year before childbirth; and the parent must take leave from the time when one becomes primary carer until the end of the parental leave period | Eligibility for paid parental leave: before the Paid Parental Leave scheme vs after the Paid Parental Leave scheme | Maternal mental health (measured 12–14 months post partum) |
| Honkaniemi et al (2022) ³⁷ | Sweden Total population registers | 1992–2000 | Uncontrolled before–after | First-time fathers with singleton children without previous or incident hospital admission for schizophrenia | Father's quota, introduced on Jan 1, 1995; reserved 30 days of existing paid parental leave to fathers, to be forfeited if left unused | Eligibility for father's quota of paid parental leave: pre-reform vs post-reform | Paternal hospital admissions for psychiatric disorders (measured up to 3 years post partum) |
| Irish et al (2021) ⁴⁰ | New Jersey and California (USA) National Health Interview Survey | 1997–2016 | Controlled before–after | Adults who worked and had children aged <2 years in household | (1) New Jersey Paid Family Leave, introduced in July, 2009; up to 6 weeks of leave at two thirds of weekly earnings; and (2) California Paid Family Leave, introduced on July 1, 2004; the California Paid Family Leave allows employees up to 6 weeks of paid leave (55% of average salary up to a maximum amount per week) if they have been employed during the year before the child's birth and earned at least US\$300 to care for a neonate or adopted child or for a seriously ill family member; the California Paid Family Leave together with the Family and Medical Leave Act provides job protection to eligible employees | Eligibility for paid parental leave: parents in California before and after July, 2004 and in New Jersey before and after July, 2009 vs parents in states with no parental leave policies from 1997 to 2016 | Parental psychological distress (measured up to 2 years post partum) |
| Lee et al (2020) ⁴⁴ | USA Panel Study of Income Dynamics | Different data collection periods: 1993–97, and biennially from 1999 to 2017 | Controlled before–after | Parents of child aged less than 2 years with their child's state of birth recorded (excluding Rhode Island or New Jersey); at least one parent was employed in the year before the child's birth | California Paid Family Leave, introduced on July 1, 2004; the California Paid Family Leave allows employees up to 6 weeks of paid leave (55% of average salary up to a maximum amount per week) if they have been employed during the year before the child's birth and earned at least US\$300 to care for a neonate or adopted child or for a seriously ill family member; the California Paid Family Leave together with the Family and Medical Leave Act provides job protection to eligible employees | Eligibility for paid parental leave: whether the parent's child was born in California after July, 2004 vs parent's child born in a state with no paid family leave (excluding New Jersey and Rhode Island) | Parental psychological distress (measured up to 2 years post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome | |
|---|------------------|---|--|---------------------------|---|--|--|---|
| <i>(Continued from previous page)</i> | | | | | | | | |
| McGovern et al (1997) ⁴⁸ | Minnesota (USA) | Medical supplement to the birth record from the Minnesota Department of Health and unnamed survey | Different data collection periods: October and December, 1991, and February, 1992 | Cross-sectional | English-speaking women living in Minneapolis-Saint Paul (USA) who worked at least 20 h per week in the year before childbirth | Minnesota Parental Leave Act, introduced in 1987; the Minnesota Parental Leave Act provides 6 weeks of unpaid, job-protected parental leave to care for a neonate or adopted child for employees who work for an employer with >21 employees; the employee must have worked (part time or full time) for 12 consecutive months before requesting leave; the employer must reinstate the benefits received before the employee's leave | Eligibility for and uptake of paid or unpaid parental leave, by duration: leave (as a continuous variable) | Maternal mental health (measured approximately 7 months post partum, varying from 6 months to 9 months) |
| Zhang and Managi (2020) ⁵¹ | Japan | Unnamed survey | November, 2015 (pre-reform); November, 2016 (pre-reform); and November, 2017 (post-reform) | Uncontrolled before-after | Mothers aged ≤49 years, in regular employment but having difficulties in child-care arrangement for child aged ≤19 months | Parental leave extension, introduced on Oct 1, 2017; parents with regular employment, but still on paid parental leave when the child is aged 18 months, and who have difficulties in arranging child care, are eligible for a 6-month extendable paid parental leave period, thereby increasing the maximum length of post-partum job-protected leave from 18 months to 24 months | Eligibility for paid parental leave extension: pre-intervention vs post-intervention | Maternal stress (measured up to 19 months post partum) |
| Observational studies | | | | | | | | |
| Caperelli Gergel and Terry (2022) ⁵⁴ | USA | Unnamed survey | August, 2021 | Cross-sectional | Female medical physicians | Not stated | Uptake of parental leave, by duration: leave (as a continuous variable) | Maternal stress; maternal burnout (study does not specify how long after childbirth outcomes were measured) |
| Cardenas et al (2021) ⁵⁵ | California (USA) | Unnamed longitudinal study on transition to parenthood | Not stated | Cohort | Heterosexual couples living together in California who reported on paternity leave and provided prenatal and post-partum data | California Paid Family Leave, introduced on July 1, 2004; the California Paid Family Leave allows employees up to 6 weeks of paid leave (55% of average salary up to a maximum amount per week) if they have been employed during the year before the child's birth and earned at least US\$300 to care for a neonate or adopted child or for a seriously ill family member; the California Paid Family Leave together with the Family and Medical Leave Act provides job protection to eligible employees | Uptake of paid paternity leave: unpaid leave, no leave, or self-employed vs any paid leave | Maternal and paternal depressive symptoms (measured 6 months post partum); maternal and paternal stress (measured 6 months post partum) |
| Clark et al (1997) ³⁸ | Wisconsin (USA) | Wisconsin Maternity Leave and Health Project | June, 1990–September, 1991 | Cross-sectional | Employed women (aged >18 years) in a cohabiting relationship with their 4-month-old infant. | Not stated | Parental leave uptake, by duration: leave (as a continuous variable) | Maternal depressive symptoms (measured 4 months post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome | |
|--|-------------------|-----------------------|---|-----------------|--|--|--|--|
| <i>(Continued from previous page)</i> | | | | | | | | |
| des Rivières-Pigeon et al (2001) ³⁰ | Canada | Unnamed study | April 10–October 23, 1996; follow-up at 6 months post partum | Cohort | French-speaking women who were aged >18 years, had a singleton birth, and had one of the following employment statuses: working part time or full time, on maternity leave, homemakers (non-working mothers with no intention of working during the first year post partum), and non-working mothers actively seeking employment | Not stated | Uptake of maternity leave: women on maternity leave vs workers | Maternal depressive symptoms (measured 6 months post partum) |
| Dundon et al (2021) ³² | USA | Unnamed online survey | October, 2019–May, 2020 | Cross-sectional | Female paediatric medical junior doctors from 13 institutions in the USA | Not stated | Uptake of parental leave, by duration: ≤6 weeks vs >6 weeks | Maternal burnout (measured up to 12 months post partum); maternal post-partum depressive symptoms (measured up to 12 months post partum) |
| Feldman et al (2004) ³³ | Connecticut (USA) | Unnamed survey | April, 1996–February, 1998 | Cross-sectional | Married dual-earner parents (mothers and fathers) whose first child was between age 3 months and 5 months; all children were first-born, born at term age in a singleton birth, and were healthy since birth; the mother had to be employed before childbirth, take a period of maternity leave, and resume employment by the time of the survey | Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Uptake of unpaid maternity leave, by duration: leave in days (as a continuous variable); uptake of unpaid paternity leave, by duration: leave in days (as a continuous variable) | Parent depressive symptoms (measured 3–5 months post partum); paternal state anxiety (measured 3–5 months post partum) |
| Gjerdingen et al (1991) ³⁴ | Minnesota (USA) | Unnamed study | December, 1984–August, 1986; follow-up at 6 weeks, 3 months, and 6 months post partum | Cohort | Employed (>20 h per week), married, primiparous women (aged >18 years) with pregnancies at at least 20 weeks of gestation and who had no children already living at home | Not stated | Uptake of parental leave, by duration: ≤6 weeks vs 6 weeks–3 months vs 3–6 months vs >6 months | Maternal depressive symptoms (measured 6 weeks, 3 months, and 6 months post partum) |
| Gjerdingen et al (1994) ³⁵ | Minnesota (USA) | Unnamed study | 1989; follow-up at 1 month, 3 months, 6 months, 9 months, and 12 months post partum | Cohort | White, English-speaking, married, primiparous women who were or had recently been employed | Not stated | Uptake of parental leave, by duration: <9 weeks (reference) vs 9–24 weeks and >24 weeks | Maternal mental health (measured 1 month, 3 months, 6 months, 9 months, and 12 months post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|---|--|--|-----------------|---|---|--|--|
| <i>(Continued from previous page)</i> | | | | | | | |
| Hwang et al (2021) ³⁸ | Unnamed survey | January–August, 2018 | Cross-sectional | Employed mothers in dual income relationships who were eligible to take paid leave and who returned to the workplace after childbirth in the central New York area in 2018 | New York State Paid Family Leave, introduced on Jan 1, 2018; the New York State Paid Family Leave provides employees up to 12 weeks of job-protected, paid family leave at 67% of the average weekly wage for employees in 2021; for eligibility, parents must be full-time employees, or part-time employees who have worked at least 20 h per week during 26 consecutive weeks or who have worked less than 20 weeks during 175 days; employees can also get paid family leave through a small weekly payroll deduction (0–126% of their weekly wage) | Uptake of paid parental leave, by generosity: no paid leave vs any paid leave | Maternal depressive symptoms (measured 6–8 weeks post partum) |
| Hyde et al (1995) ³⁹ | Wisconsin Maternity Leave and Health Project | June, 1990–September, 1991 | Cohort | Women (aged >18 years) working more than 6 h per week and not on maternity leave | Not stated | Uptake of parental leave, by duration: leave (as a continuous variable) | Maternal depressive symptoms (measured 4 months post partum); maternal anxiety (measured 4 months post partum) |
| Jou et al (2018) ⁴¹ | Listening to Mothers III survey | October–December, 2012; follow-up in January–April, 2013 | Cohort | Women aged 18–45 years who gave birth to singleton infants between July, 2011, and June, 2012 | Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Uptake of paid, unpaid, or no maternity leave, by generosity: no leave (reference) vs unpaid leave, and partly or fully paid leave; uptake of paid maternity leave, by duration: no paid leave (reference) vs 1–6 weeks of paid leave, 7–12 weeks of paid leave, and >12 weeks of paid leave | Maternal depressive symptoms in the 2 weeks before the survey (measured average 14.3 months post partum), mother seeing a mental health provider since giving birth (measured average 14.3 months post partum) |
| Klein et al (1998) ⁴² | Wisconsin Maternity Leave and Health Project | June, 1990–September, 1991; follow-up in 1992 | Cohort | Women (aged >18 years) who had returned to work at least 3 weeks before the Time 4 interview, which was done 1 year post partum; worked more than 6 h per week; and were not pregnant at the time of the interview | Not stated | Uptake of parental leave, by duration: leave (as a continuous variable) | Maternal depressive symptoms (measured 1 year post partum); maternal anxiety (measured 1 year post partum) |
| Kornfeind and Sipsma (2018) ⁴³ | Listening to Mothers III survey | January–April, 2013 | Cross-sectional | Women who were employed full time by someone else (not self-employed) during pregnancy, who had returned to work full time at the time of the survey and who had given birth to a full-term baby (≥37 weeks of gestation); baby was healthy (ie, had not been admitted to the neonatal intensive care unit) | Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Uptake of paid, unpaid, or paid and unpaid maternity leave, by duration: leave (as a continuous variable) | Maternal post-partum depressive symptoms (measured up to 12 months post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome | |
|--|-------------|---|------------------------------|-----------------|--|--|--|--|
| <i>(Continued from previous page)</i> | | | | | | | | |
| Lidbeck et al (2018) ⁴⁵ | Sweden | Unnamed survey | January, 2011–January, 2013 | Cohort | Parents from southwest Sweden who were cohabitating and were fluent in Swedish | Not stated | Uptake of paid parental leave, by sharing of equal sharing of leave vs unequal sharing of leave | Parenting stress (measured 6 months and 18 months post partum) |
| Mandal (2018) ⁴⁶ | USA | Early Childhood Longitudinal Survey—Birth Cohort | October, 2001–December, 2002 | Cross-sectional | Women who had singleton births, worked full time before childbirth and were not self-employed | Family and Medical Leave Act; introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Uptake of paid, unpaid, or paid and unpaid maternity leave, by duration: returned to work by survey date (maternity leave >12 weeks) vs did not return to work by survey date (maternity leave >12 weeks), and returned to work by 12 weeks vs returned to work after 12 weeks; uptake of maternity leave, by contract type or generosity; returned to work by survey date and received some paid leave vs returned to work by survey date and received no paid leave, returned to work by 12 weeks and received some paid leave vs returned to work by 12 weeks and received no paid leave, returned to full-time work by survey date and received some paid leave vs returned to full-time work by 12 weeks and returned to full-time work by 12 weeks and received some paid leave vs returned to full-time work by 12 weeks and received no paid leave | Maternal post-partum depression (measured approximately 9 months post partum); major depressive disorder (measured approximately 9 months post partum) |
| Månsdotter and Lundin (2010) ⁴⁷ | Sweden | Swedish parental and child cohort of 1988–89 | 1988–2008 | Cohort | All fathers born from 1950 onwards in Sweden who had their first child in 1988–89 and were alive together with the associated mother and child between 1988 and 1990 | Not stated | Uptake of paid paternity leave, by duration: no leave (reference) vs 1–10 days leave, 11–30 days leave, 31–60 days leave, 61–135 days leave, and >135 days leave | Paternal suicide (measured 3–20 years after childbirth) |
| Nishigori et al (2020) ⁴⁸ | Japan | Adjunct study of the Japan Environment and Children's Study | January, 2011–March, 2014 | Cohort | Fathers enrolled in the adjunct study of the Japan Environment and Children's Study | Not stated | Uptake of paternity leave: no leave vs any leave | Paternal post-partum depressive symptoms (measured 1 month and 6 months post partum) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|---|--|-------------------------|-----------------|--|--|---|--|
| (Continued from previous page) | | | | | | | |
| Perry-Jenkins et al (2017) ³⁰ England (USA) | Unnamed survey | 1999–2002 | Cohort | Working class heterosexual couples in their third trimester of pregnancy and expecting their first child in western New England | Not stated | Uptake of paid and unpaid parental leave, by duration: work has a parental leave policy vs work has no parental leave policy | Maternal and paternal depressive symptoms (measured 4 months, 6 months, and 12 months post partum); maternal and paternal anxiety (measured 4 months, 6 months, and 12 months post partum) |
| Petts (2018) ³¹ USA | Fragile Families and Child Wellbeing Study | 1998–2001 | Cohort | Mothers who were residing with their child, had worked up until at least the third trimester of pregnancy and were interviewed in both the baseline and 1-year follow-up surveys | Family and Medical Leave Act, introduced on Aug 5, 1993; the Family and Medical Leave Act provides 12 weeks of unpaid job-protected leave to eligible employees of covered employers; a covered employer is a private employer with >50 employees for 20 weeks in the previous year, a public agency, and a public or private elementary or secondary school; to be eligible, employees must have worked for at least 12 months for their employer and worked at least 1250 h in the 12 months before taking leave | Uptake of parental leave, by duration: ≤1 month leave (reference) vs 2–3 months of leave, 4–6 months of leave, >6 months of leave, and did not return to work | Maternal depression (measured 12 months post partum); maternal parenting stress (measured 12 months post partum) |
| Philpott and Corcoran (2018) ³² Ireland | Unnamed survey | Not stated | Cross-sectional | Employed fathers (aged >19 years) whose infants were born in the previous year | Not stated | Uptake of paternity leave: no leave vs any leave | Paternal post-partum depression (measured up to 12 months post partum) |
| Pinker et al (2021) ³³ Germany | Kinder-Uniklinik Ostbayern—Kids Health Study | June 2015–June 2018 | Cohort | Women aged >18 years who gave birth at St Hedwig hospital in Regensburg (Germany) and had adequate German language skills | Not stated | Eligibility to earnings-related maternity leave: employed before leave vs unemployed before leave | Maternal mental health (measured 4 weeks post partum) |
| Richman et al (1991) ³⁵ Chicago (IL, USA) | Unnamed survey | 1987 | Cross-sectional | Married women (aged >18 years) expecting their first child with no major health issues | Not stated | Uptake of parental leave, by duration: on maternity leave vs in full-time employment | Maternal depressive symptoms (measured 8 weeks post partum) |
| Seimyr et al (2004) ³⁶ Sweden | Unnamed study | October 1993–March 1994 | Cross-sectional | Swedish-speaking pregnant women living in Stockholm | Not stated | Uptake of paid paternity leave: no leave vs any leave | Maternal and paternal postnatal depressive symptoms (measured 2 months post partum) |
| Séjourné et al (2012) ³⁶ France | Unnamed survey | November 2010–May 2011 | Cohort | French-speaking couples aged >18 years | Not stated | Uptake of paid paternity leave: no leave vs any leave | Maternal post-partum depression (measured 2 months post partum) |
| Shumbusho et al (2020) ³⁷ USA | Unnamed survey | May 2017–January 2018 | Cross-sectional | Women who had been on active duty in the previous 20 years and had a baby while on active duty | Paid maternity leave extension, introduced in January 2016; the US Department of Defense increased the duration of paid maternity leave from 6 weeks to 12 weeks for active duty service members | Uptake of paid maternity leave, by duration: 6 weeks vs 12 weeks | Maternal post-partum depression (measured in retrospect up to 20 years after childbirth) |

(Table 1 continues on next page)

| Location | Data source | Data period | Study design | Sample | Parental leave policy | Parental leave measure comparisons | Mental health outcome |
|---------------------------------------|---|--|-----------------|---|--|---|---|
| (Continued from previous page) | | | | | | | |
| Stack et al (2018) ³⁸ | USA Unnamed survey | May, 2016 | Cross-sectional | Female medical junior doctors | Not stated | Uptake of unpaid maternity leave, by duration: <8 weeks vs ≥8 weeks | Maternal burnout (measured up to 12 months post partum); maternal post-partum depression (measured up to 12 months post partum) |
| Stack et al (2019) ³⁹ | USA Unnamed survey | A 6-week period in 2017 | Cross-sectional | Female medical junior doctors | Not stated | Uptake of paid, unpaid, or paid and unpaid parental leave, by duration: ≤6 weeks vs >6 weeks | Maternal burnout (measured up to 12 months post partum); maternal post-partum depression (measured up to 12 months post partum) |
| Whitehouse et al (2013) ⁴⁰ | Australia Longitudinal Study of Australian Children and the Parental Leave in Australia Survey | Longitudinal Study of Australian Children: collection periods in 2004 and 2006; Parental Leave Survey: collection period in 2005 and follow-up in 2006 | Cohort | Mothers in a couple relationship who had returned to work by 2005 and whose children were singleton births, born in Australia at 32 weeks (or later) of gestation, and who did not have special health-care needs in 2004 or 2006 | National legislation (2003–06); parents who had the same employer for 12 months before childbirth were eligible to 52 weeks of unpaid, job-protected leave that could be split between the parents; some mothers had access to paid maternity leave either under dedicated provisions for public service employees (for up to 14 weeks) or through company policies or industrial agreements (usually 6 weeks or 12 weeks); some fathers had access to 1 week or 2 weeks of paid paternity leave; payments were normally at salary replacement level | Uptake of paid maternity leave, by duration: no paid leave (reference) vs ≤6 weeks of paid leave, 7–13 weeks of paid leave, and >13 weeks of paid leave; uptake of paid and unpaid maternity leave, by duration: ≤26 weeks of leave (reference) vs 27–52 weeks of leave, and >52 weeks of leave | Maternal psychological distress (measured 2–3 years post partum) |

Table 1: Descriptive overview of included studies

| | Quasi-experimental studies | Observational studies |
|-----------------------------------|---|---|
| Parental leave | Availability of any parental leave | Uptake of any parental leave ^{25,49,52,55,56} |
| Parental leave by benefit payment | Eligibility for paid parental leave ^{18,21–23,31,36,37,40,44*} | Uptake of parental leave by payment benefits (either paid or unpaid leave) ^{38,41,46,53†‡} |
| Parental leave by duration | Eligibility for extension of parental leave ^{17–19,20,23,26,27,29,48,61*§} | Uptake of parental leave by length of leave ^{24,26–30,32–35,39,41–43,45–48,50,51,54,57–60†§} |

*Avendano and colleagues¹⁸ and Bütikofer and colleagues²³ assess both the introduction of paid parental leave and extended leave. †Pinker and colleagues⁵³ assess eligibility to earnings-related parental leave benefits using observational, individual-level comparisons. ‡Jou and colleagues⁴¹ and Mandal⁴⁶ assess uptake of parental leave by both payment benefits and length of leave. §Quasi-experimental studies by Chatterji and Markowitz,²⁶ Chatterji and Markowitz,²⁷ Dagher and colleagues,²⁹ and McGovern and colleagues⁴⁸ assess both eligibility for, and uptake of, parental leave.

Table 2: Classification of parental leave measures

lower risks of depressive symptoms and major depressive disorder than women receiving unpaid leave.⁴⁶ By contrast, other USA-based studies found no difference in depressive symptoms,^{38,41} although one study reported lower risk of mental-health-care use in mothers who received paid leave than in mothers who received no or unpaid leave.⁴¹ A German study found no difference in post-partum mental health between women who received earnings-based benefits and women who received a lower basic flat-rate benefit.⁵³

Schemes lengthening parental leave generally appeared to be favourable for maternal post-partum mental health in quasi-experimental studies.^{17,19,20,26,27,29,61} Three USA-based studies examining both unpaid and paid leave extensions up to 6 months post partum showed decreases in depressive symptoms among mothers with longer leave uptake, with less conclusive findings for extensions of paid leave alone.^{26,27,29} Another USA-based study with less reliable instruments (eg, infant health and child-care arrangements) found improved mental health among women with extended paid and unpaid leave.⁴⁸ Other studies found that paid leave extensions led to decreased risks of stress among mothers in Chile¹⁷ and Japan⁶¹ and reduced rates of inpatient and outpatient hospital admissions for mental and behavioural disorders in mothers living in Denmark.²⁰ Conversely, a Canadian study, which was given a weak risk of bias score, showed no changes in maternal depression risks before and after the extension of paid leave.¹⁹

Observational evidence from the USA suggested that mothers' longer uptake of parental leave was associated with reduced risks of depressive symptoms. 11 of 18 studies found that length of unpaid, paid, or combined leave was associated with some decrease in depressive symptoms,^{26,27,32,33,41,43,47,51,54,57,58} whereas seven studies found no change.^{28,29,34,39,42,50,59} Protective lengths of leave varied across studies. Three studies found no

differences in maternal depressive symptoms among mothers who took up to 6 weeks of leave.^{34,41,59} Five studies, including three studies with a low-quality risk of bias score,^{32,54,58} showed fewer depressive symptoms and lower rates of severe depression in mothers taking at least 7 weeks of leave than in women with a shorter leave period^{27,32,51,54,58} whereas one study showed no differences.⁴¹ Four studies, of which one received a low-quality risk of bias score,⁵⁷ also found decreases in depressive symptoms or depression among women taking at least 12 weeks of leave compared with women taking a shorter leave duration.^{27,41,46,57} Finally, two studies, including one from Canada,³⁰ noted lower depression among women on maternity leave at 6 months post partum compared with mothers not on leave (ie, working at 6 months)³⁰ or with women who took up to 1 month of leave.⁵¹ For continuously increasing length of leave, two studies, including one study rated low quality in the risk of bias assessment,³³ showed decreased maternal depressive symptoms^{26,33} whereas five studies showed no change.^{28,29,39,42,50} Kornfeind and Sipsma⁴³ found that individuals taking less than 12 weeks of leave had decreased depressive symptoms with increasing length of leave, but found no association between leave duration and depressive symptoms when individuals took more than 12 weeks of leave.

Extended parental leave appeared to be protective against other mental health outcomes among mothers. Six USA-based studies, three of which obtained a low-quality risk of bias score,^{24,32,58} found that longer leave (with duration varying depending on study; appendix pp 60–62) was associated with better mental health³⁵ and decreases in stress,^{24,51} burnout,^{24,32,58} and mental health-care use,⁴¹ albeit with less conclusive findings for shorter leave duration (appendix pp 60–62).^{32,35,41} No difference in general mental health^{29,48} or anxiety⁵⁰ was observed in mothers when length of leave was measured as a continuous variable. In Australia, more than 13 weeks of paid leave (*vs* no paid leave) and 27–52 weeks of total leave (*vs* ≤26 weeks) were associated with reduced psychological distress in mothers.⁶⁰ In various European countries, parental leave reforms that jointly introduced (or extended) paid benefits and prolonged leave appeared to be favourable to mothers' long-term mental health.^{18,23}

For fathers' parental leave use and mental health, quasi-experimental evidence showed mixed findings by state and country context. In California, findings suggested no⁴⁴ or some²² improvements in fathers' mental health, whereas a study considering leave policies in both California and New Jersey (which had a higher wage replacement rate than California) showed mental health improvements in fathers taking paid leave compared with fathers in states not providing paid leave.⁴⁰ In Sweden, a study on the introduction of the father's quota to encourage use of fathers paid

parental leave showed decreases in psychiatric hospital admissions among migrant fathers post-reform; however, no difference was observed among fathers born in Sweden.³⁷

Use of fathers' parental leave in Ireland, Japan, Sweden, and the USA was associated with decreased risks of depression^{52,55} and stress²⁵ in three observational studies, and no change in depression in two studies,^{25,49} compared with no use of leave at all. Uptake of extended parental leave among fathers was negatively associated with paternal stress and anxiety in two studies,^{33,45} of which one received a low-quality risk of bias score,³³ with no association found for depressive symptoms in one study.³³ Although a study in Sweden found that fathers' leave duration was associated with an increased risk of long-term suicide risk among men who took 1–10 days of paid leave compared with men who did not take leave, no difference was found when leave was extended to more than 1 month.⁴⁷

Only one study examined the indirect effect of use of mothers' parental leave on fathers' mental health, with findings showing that longer leave was associated with decreased paternal anxiety but no difference was observed with paternal depressive symptoms.⁵⁰ Eligibility and uptake of fathers' parental leave generally appeared to be beneficial for maternal mental health. Three studies from Australia,²¹ Sweden,⁵⁵ and the USA²⁵ found improved maternal health in the form of decreased depressive symptoms with any father's leave^{25,55} or after introduction of paid partner's leave,²¹ whereas one study from Sweden found no effect of parental leave division on maternal stress.⁴⁵ One study from France found that use of fathers' leave increased risks of maternal depression, but not maternal depressive symptoms.⁵⁶ A detailed narrative synthesis of quantitative studies and detailed information on country-level leave policies are given in the appendix (pp 55–75).

Discussion

This systematic review summarises the literature on parental leave and parents' mental health. The included studies focused on the effect of different aspects of generosity—parental leave benefits and duration—on mothers' and fathers' mental health during the post-partum period and beyond, and the indirect effect of one parent using parental leave on the partner's mental health. Overall, evidence suggests that parental leave is protective against poorer mental health for mothers in the post-partum period, especially paid leave of at least 2–3 months. This finding was observed despite large study heterogeneity by country context, outcome, and methodological design, including both observational and quasi-experimental evidence.

The association between fathers' paid leave and paternal mental health was primarily examined through quasi-experimental studies assessing policy reforms.

Despite inconclusive findings, evidence suggested that fathers exhibit mental health improvements with policies that provide either adequate wage replacement or incentives through other means, such as uptake quotas. By contrast, fathers' parental leave duration was predominantly examined in observational studies with mixed findings for paternal mental health.

We found evidence that the protective effect of parental leave for maternal mental health could outlast the post-partum period into later life. However, no evidence of long-term benefit was observed for fathers.

The indirect effects of one parent's leave on their partner's mental health showed conflicting results. Mothers' extended leave was associated with a decreased risk of paternal anxiety, but not depression, whereas the association between fathers' leave and maternal mental health was inconclusive.

Studies showed several general limitations and inconsistencies that hindered comparability and synthesis of results. Limitations particularly among observational studies include issues of selection bias, confounding, and reverse causality, whereas inconsistencies for both observational and quasi-experimental studies include differences in design, operationalisations of parental leave comparisons, outcomes, and follow-up.

Some inconsistencies were found between observational and quasi-experimental findings, with results from quasi-experimental studies having more definitive evidence of the effects on mental health. These inconsistencies could arise because observational studies are more subject to selection bias and confounding. For instance, labour market attachment and amounts of leave reimbursement might influence leave uptake and duration, because people with lower means might be more inclined to return to work earlier despite being eligible for benefits. Accordingly, observational studies might be more likely to show null or mixed effects because of selection bias, depending on the socioeconomic barriers experienced by parents in accessing paid benefits. Furthermore, many observational studies included in this Review did not account for preconception health, and might thus be subject to confounding, especially for extreme health outcomes including psychiatric diagnoses. Such limitation is particularly pertinent because prospective observational evidence shows that a large proportion of depression in the post-partum period is rooted in preconception mental health.⁶²⁻⁶⁴ The scarcity of control for preconception mental health disorders prevents us from concluding whether parental leave is protective against the onset of mental health issues, and raises the question of whether parental leave could also mitigate other chronic conditions.

The aforementioned biases in observational designs are minimised in quasi-experimental studies assessing the introduction or extension of paid leave schemes

(ie, comparing eligible parents before and after the policy reform), or in quasi-experimental studies with instrumental variables that control for confounding and measurement error when assessing the association between parental leave duration and mental health, thereby allowing for the possibility of making causal inferences. Although quasi-experimental studies are more suitable to infer causality, the extrapolation of their findings should also be done with caution. Since most quasi-experimental studies estimate the effect of parental leave on parents' mental health by use of a policy introduction or reform, these studies arguably measure the effect of eligibility rather than uptake. Whether eligibility for parental leave has an independent effect on parents' mental health remains to be examined. Furthermore, quasi-experimental studies cannot completely rule out the possibility of reverse causality—that is, whether a parent's mental health after childbirth influences their parental leave length through their decision to return to work. Consequently, we recommend all future studies to consider that “absence of evidence is not evidence of absence”.⁶⁵ Publishing null findings could help reduce publication bias, which is common in social science research.⁶⁶

No observational or quasi-experimental studies specifically considered the role of the work requirement for paid parental leave in parents' mental health, highlighting one of the main knowledge gaps identified by this Review. Eligibility for paid parental leave is dependent on employment status and time in employment before childbirth, thus individuals with weak labour market attachment stemming from poor health might not meet the work requirements for paid parental leave.⁶⁷ This omission might lead to an underestimation of the actual effect of paid leave on mental health because not all parents are eligible to paid parental leave (ie, there is selection into access to paid leave). Additionally, increasing payment generosity among eligible parents, without lowering the eligibility requirements for paid leave, could lead to increasing social inequalities in health.

To delve into which components of parental leave are protective for mental health, future studies should appraise the comparison groups to assess the effect of parental leave on parents' mental health. For example, studies compared paid leave with no paid leave (rather than no leave) or a combination of unpaid leave and no leave. Similarly, parental leave length was examined for unpaid, paid, and total (unpaid and paid) leave. The lack of clear comparison groups, together with the absence of studies that assess the introduction of parental leave schemes, limits the possibility to accurately disentangle the effects of any leave, paid leave, and leave duration.

In relation to the outcomes, we included studies examining various measures of mental health and,

although we generally observed protective effects of parental leave, we also found inconsistencies, for example between mothers and fathers. Further studies should examine whether this heterogeneity could be explained by the operationalisation of the outcome and should rely on validated scales and country-specific cutoffs. Similarly, we did not restrict the timing of follow-up to account for possible long-term effects and because no standard definition for the post-partum period is available. Although we found evidence of protective effects lasting several years after childbirth and in later life, more research is needed to substantiate these findings.

To our knowledge, this systematic review is the first to present a complete summary of the effect of different dimensions of parental leave, including amounts of benefits and leave duration, on both mothers' and fathers' mental health. The Review has multiple strengths: a protocol was prospectively registered on PROSPERO; the search strategy was developed in consultation with a librarian; there were no geographical or time restrictions to the search; PRISMA and SWiM guidelines were used to ensure a systematic and transparent approach to synthesising the available information; and two reviewers independently assessed all studies and risk of bias. The main limitations of this Review are a consequence of our exclusion criteria: by excluding grey literature and peer-reviewed articles not written in English, we might have overlooked studies done in low-income and middle-income countries. Furthermore, because of insufficient results, we were unable to closely assess heterogeneity by policy-specific and country-specific context, or by degree of adjustment for potential confounders. Moreover, due to the lack of comparable results in the literature by population, specific mental health outcome, and parental leave policy domain, we could not pool estimates by use of meta-analysis.

Our narrative synthesis strongly suggests that parental leave generosity contributes to alleviating or preventing mental health problems, particularly for mothers—a finding that is highly relevant from a policy perspective. Additionally, the evidence synthesised in this Review showed that parental leave can be protective against poorer mental health. This finding was especially apparent in mothers, who experienced decreased risks of common mental health disorders with paid leave lasting more than 2–3 months. Findings on fathers remain scarce, although evidence suggests that more generous parental leave schemes could reduce mental health risks. Taken together, the findings of this Review have implications for the wellbeing of the entire family in the long term.

Contributors

All authors designed the study and did the data extraction, synthesis, and quality assessments. AH drafted the first version of the manuscript and all authors made substantial contributions. All authors were

involved in the scientific processes leading up to the writing of the manuscript and contributed to the interpretation of the findings and the critical evaluation of the final version of the manuscript.

Declaration of interests

We declare no competing interests.

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