GrOW
Research Series

# Daycare and women's health, social, and economic outcomes in low- and middle-income countries: Systematic review and evidence synthesis

By Sam Harper, Nichole Austin and Arijit Nandi (McGill University)

ISID
INSTITUTE FOR THE STUDY OF INTERNATIONAL DEVELOPMENT

GrOW Working Paper Series
GWP-2017-07 – Research Contribution Paper

Produced with support from McGill University and the International Development Research Centre (IDRC). Working papers are in draft form and distributed for purposes of comment and discussion only. The observations and views expressed in this working paper are the sole responsibility of the author(s).

## Abstract

Systematic reviews from high-income countries suggest that increasing the availability of daycare can improve economic outcomes for mothers, but similar research from low- and middle-income countries is lacking. To address this issue, we systematically searched databases of published and unpublished literature for studies that measured the impact of daycare provision on social, economic, and health outcomes in low- and middle-income countries without language or publication date restrictions. We synthesized the evidence using both narrative review and random effects meta-analysis. Our search strategy returned 2073 studies and an additional 13 were added after applying our exclusion criteria. We estimate that for a 30 percentage point increase in daycare utilization maternal employment increased by 6 percentage points (95% confidence interval: 4 to 8), but we found considerable between-study heterogeneity and evidence of effect measure modification within studies. The impact on maternal earnings was mixed, and few studies assessed the impact of daycare on non-economic outcomes. We also found moderate but heterogeneous evidence that interventions to increase access to formal daycare increase maternal labor force participation. Future studies would benefit from assessing the impact of daycare on non-economic outcomes and understanding the heterogeneity between studies.

## Background

Advancing women's ability to equally participate in and benefit from the processes advancing sustainable economic growth is a key goal for increasing women's empowerment across the globe (OECD 2012). Though there are many barriers to increasing the status of women worldwide, the responsibility of caring for children and other family members weighs particularly heavy on the world's women, and limits their economic prospects. In many (though not all) high-income countries, access to center-based child care has increased alongside the increase in women's labor force participation, and there is now good evidence of positive impacts on both women and their children (Del Boca et al. 2015). However, in poor countries there is limited evidence on this question. In addition, the empirical evidence on daycare and mother's economic outcomes may not be generalizable to low-income environments. Important differences in the quality and structure of daycare programs, availability of work opportunities, household dynamics, and time constraints may lead daycare to have different impacts on mothers in low-resource environments. Nevertheless, access to daycare may still reduce barriers to maternal labor force participation, and employment in the formal (or semi-formal) economy as opposed to informal/domestic employment is one of the building blocks for women's empowerment (Kabeer 2012). Increased empowerment, in turn, may have a positive effect on women's health, social connectedness, and position within both the household and the community.

Existing systematic reviews have summarized evidence on daycare and children's outcomes in both high income (van Urk et al. 2014) and low-income settings (Brown et al. 2014) but evidence on maternal outcomes is relatively sparse. A recent unpublished literature review (Mateo Diaz and Rodriguez Chamussy 2013) looked specifically at non-parental daycare and women's economic outcomes in Latin America and the Caribbean, and concluded that daycare access was associated with increased maternal labor force participation. However, no review to-date has systematically examined the effects of daycare on maternal economic, social, and health-related outcomes in all low- to middle-income countries. Our goal was to address this knowledge gap and summarize the current evidence in this area.

## Methods

### *Search strategy*

We registered this review prospectively in the PROSPERO (ID# CRD42015014390) database (Nandi et al. 2015). Search strings were built in collaboration with a liaison librarian at McGill University (see Appendix for details on the search strategy). Our primary exposure of interest was childcare, which we defined as formal, out-of-home care for children in a public location, to be distinguished from informal systems that rely on care in home by relatives, nannies, or

friends. Facilities could be primarily education-based (e.g. early childhood education centers, or ECEs), care-based (e.g. nursery schools, daycare centers, etc.), or a combination of both. We included both publicly and privately funded centers/programs. Because of the sparseness of evidence on daycare's impact on women's outcomes in low-income countries, we looked at a broad range of outcomes. Our primary outcomes of interest fell into three general categories: women's health (e.g. mortality, mental health, quality of life), economic outcomes (income, employment), and social outcomes (empowerment, freedom, self-esteem). Our list of low- and middle-income countries was based on the World Bank classification scheme as of December 2014, when we first began our search.

We built our primary search in MEDLINE using a combination of MeSH and text terms, and adapted this search to PubMED, PsycINFO, and EconLit, in addition to grey literature searches in IDEAS and POPLINE, and relevant citations from search results. Studies were eligible for inclusion if they assessed the impact of daycare (as the primary exposure) on at least one of the maternal outcomes of interest. We excluded existing reviews and/or meta-analyses, qualitative designs, policy documents, analyses centered exclusively on outcomes in children or other family members, analyses of women in high-income countries, and studies in which access to daycare was not the primary exposure of interest (e.g. studies treating daycare as a covariate were excluded). We also excluded studies on other familial caregivers (e.g. grandparents, siblings), in accordance with our primary exposure definition. We did not apply any language or publication date restrictions. Search results are current as of April 2017.

### *Search process and data extraction*

We conducted three stages of review. We screened titles and abstracts to identify a pool of potentially relevant articles. Two reviewers (AN, SH) independently assessed the full-text versions of the screened articles and retained studies that aligned with our inclusion criteria. Two other reviewers (NA, JM) extracted data from the retained studies using an extraction form designed to assess individual study quality and potential bias. The extraction form captured information on daycare facility type (case-based or education-based, public or private), study design/methodology, maternal outcome type and ascertainment, model estimates, and potential sources of bias (particularly missing data and unmeasured confounding). Disputes between the reviewers were resolved by a third party (SH or AN).

### *Synthesis*

Where possible, we used random effects meta-analysis to quantitatively combine results across studies (Ioannidis et al. 2008) and measured heterogeneity across studies using the $I^2$ statistic, which measures the proportion of overall heterogeneity that is between studies (Borenstein et al. 2009). We created a funnel plot to assess the potential for small-sample bias (Sterne et al. 2011). Very few of the studies used similar exposure contrasts to estimate the impact of daycare, so we attempted to convert each study's reported estimate to a common exposure metric. We used a

moderate contrast of a 30 percentage point difference in exposure to daycare, based on the only randomized evaluation our search retrieved, (Barros et al. 2011) which reported that random assignment to free, publicly provided daycare increased the use of care by roughly 40 percentage points (See the Appendix for specific calculations in each study). We tested for heterogeneity across studies using Cochrane's $Q$ statistic (Higgins and Thompson 2002). For studies and outcomes that could not be standardized, we synthesized the results in qualitative terms.

## Results

Our search strategy returned 2164 articles. We obtained an additional 12 articles from colleagues and reference searching, yielding a total pool of 2073 articles for review, after excluding duplicates (Figure 1). Thirteen of these articles met our inclusion criteria. Most of the exclusions (n=1899) occurred during the title screen (Figure 1). Details of the included articles are summarized in Table 1.

Most of the studies (10/13) in our review occurred in Latin America. Maternal labor force participation was the most commonly measured outcome, reported in 11 of 13 studies. Fewer studies measured the impact of daycare on wages or income, and only two (Rosero and Oosterbeek 2011; Angeles et al. 2014) measured impacts on physical or mental health.

With respect to study designs, Barros and colleagues in Brazil (Barros et al. 2011) used a randomized lottery design and reported that enrollment in a public daycare center increased maternal employment rates by 4.2 percentage points and increased labor force participation rates by 2.5 percentage points, based on an intention-to-treat (ITT) analysis. We did not find any other randomized evaluations. However, several studies used quasi-experimental designs.

Among non-randomized studies, three estimated a local average treatment effect (LATE) using instrumental variable designs (Attanasio and Vera-Hernandez 2004; Berlinski et al. 2011; Rosero and Oosterbeek 2011). Berlinski and colleagues (Berlinski et al. 2011) used a regression discontinuity approach and took advantage of an Argentinean age-based cutoff that increased preschool attendance by roughly 30 percentage points. Women induced by the rule to enroll their children in preschool reported a 19 percentage point increases (95% CI: -1, 39) in the probability of working full time, and 8 more hours worked per week (95% CI: -1, 17). Rosero and Oosterbeek (2011) compared maternal outcomes among women just above and below a cutoff score for funding daycare centers and found that daycare centers increased maternal probability of employment by 22% (95% CI: 1, 43) and working hours by 7.6 days per week (95% CI: -0.3, 15.5). Attansio and Vera-Hernandez (2004) used distance to daycare centers as an instrument and found that daycare increased the probability of maternal employment by 38 percentage points (95% CI: 25, 49), and the number of hours worked per month by 75 hours (95% CI: 49, 102).

Four studies used difference-in-differences or fixed effect designs (Kilburn et al. 2002; Berlinski et al. 2009; Calderon 2012; Angeles et al. 2014) to estimate an ITT effect of daycare on maternal outcomes. Angeles and colleagues (Angeles et al. 2014) used a fixed effects design and compared mothers with children on daycare waiting lists to those attending the same daycares in the same locality and found differences in maternal employment and hours worked per month, but no impacts on income or measures of mental health. Both Berlinski and colleagues (Berlinski and Galiani 2007) and Calderon (2012) used variation in the construction of new preschool facilities to identify the impact on maternal outcomes, and both studies reported positive impacts on maternal employment rates but weak or imprecise effects on maternal work hours. Kilburn and colleagues (Kilburn et al. 2002) used a similar design in China and found that the construction of new daycare centers increased wage-related maternal employment by 38 percentage points (95% CI: 13, 63). Also in China, Du and Dong (2013) used a community fixed effects design to estimate that adding a new community daycare center increased labor force participation by 11% (95% CI: 2, 19) and total working hours by 5.3 per week (95% CI: 1, 9).

Finally, four other studies (Deutsch 1998; Hallman et al. 2005; Quisumbing et al. 2007; Nakahara et al. 2010) used observational design with more traditional regression adjustment. Deutsch (1998) and two studies from Hallman and colleagues (Hallman et al. 2005; Quisumbing et al. 2007) used cross-sectional data and applied Heckman selection-type models to try and control for unmeasured characteristics of women who did versus did not utilize daycare. These studies generally found limited evidence of impacts of daycare on maternal employment and earnings. Nakahara and colleagues (Nakahara et al. 2010) used a pre-post design based on measures collected while children were on waiting lists for daycare versus when they were attending daycare. They found that having a child in daycare did not increase the number of employed mothers or working hours, and had an unclear impact on wages (mean income increased, but median income decreased).

Maternal labor force participation was the most commonly reported outcome and Figure 2 shows a forest plot of estimated effect sizes on maternal employment and a summary effect estimate, based on a random effects meta-analysis that gives greater weight to more precise studies. The overall effect suggests that a 30 percentage point increase in daycare increases maternal employment by 6 percentage points (95% CI: 4 to 8). However, we found evidence of heterogeneity, with the $I^2$ statistic indicating 66% of the variance was due to between-study variation (95% CI: 31.4% to 83.3%), and Cochran's $Q$ test for heterogeneity returned a low p-value ($\chi^2 = 23.7$, $p = 0.003$). A funnel plot of effect sizes against their standard errors (Figure 3) suggested the possibility that some small negative studies may be missing, although we did not find sufficient evidence to reject the null hypothesis that the plot is symmetric (the p-value for Egger's test for asymmetry (Egger et al. 1997) was 0.21).

### *Heterogeneous effects*

A number of the studies in our sample reported effects or associations that differed across household characteristics. Several studies reported stronger impacts of daycare on maternal employment among women that were unemployed or underemployed prior to gaining access to daycare (Barros et al. 2011; Angeles et al. 2014). Berlinski and colleagues (Berlinski et al. 2011) also reported stronger effects among households with older children. On the other hand, Calderon (2012) reported no differences in treatment effect by education or urban/rural status, and Berlinksi and Galiani (2007) fail to reject tests of homogeneity by the presence/absence of spouse or child age.

Although all of our included studies reported outcomes for women, only Calderon (2012) also looked at the impact that access to daycare may have on men in the household. She found mixed effects on men, with increased daycare access reducing labor force participation by a small amount among men not working, but among working men a notable fraction switched to higher paying jobs.

### *Quality*

Our quality assessment identified concerns regarding missing data, which was often not discussed or potentially mishandled. Five of the eight articles employed a quasi-experimental design, but it was not entirely clear whether the relevant assumptions were met for each approach, and different sets of covariates were generally adjusted for in different studies.

## Discussion

Our systematic review found some evidence that increasing daycare availability has a positive impact on selected maternal economic outcomes (particularly labor force participation) in low- and middle-income countries. In that sense, our findings are in accordance with the results of a recent Latin American review (Mateo Diaz and Rodriguez Chamussy 2013), along with evidence from high-income countries (Del Boca et al. 2015). This suggests that providing access to formal, center-based daycare may have a positive effect on maternal labor force participation for women from a diverse range of low- to middle-income countries. Our summary estimate suggests that an increase in daycare utilization of 30 percentage points may increase maternal employment rates by roughly 6 percentage points.

Although several studies found positive impacts, we also found considerable heterogeneity in the magnitude of the impacts, so our summary estimate should be considered with appropriate caution. This may partially result from differences across countries in the prevalence of factors such as overall maternal employment rates, since some studies reported effect measure modification by maternal characteristics such as whether mothers were working prior to gaining access to daycare or the age of children at home. In fact, one of the more consistent

demonstrations of heterogeneity was the presence of stronger maternal employment effects among women that were not working prior to gaining access to daycare. If such effect measure modification is present within studies, then it would seem likely that this could potentially explain some of the between-study heterogeneity, though we did not have sufficient information to test whether this was the case. However, more generally it is difficult to tease apart how much of the heterogeneity in results comes, for example, from investigators using different study designs (randomized, quasi-experimental, regression adjustment), sample restrictions (e.g. ages of children or economic status of mothers), or adaptation to local context (specific programs in some areas). More challenging is the fact that very few studies used similar measures of program exposure to assess the impact of daycare on maternal outcomes. We attempted to convert studies to a common exposure contrast, but this could not be done for all studies.

Although an impact on maternal labor force participation was evident for a number of studies, it was only one of our outcomes of interest. For example, the impact of daycare on maternal earnings was unclear (Quisumbing et al. 2007; Nakahara et al. 2010), which is consistent with previous findings (Mateo Diaz and Rodriguez Chamussy 2013). In addition to conflicting evidence on the relationship between daycare provision and maternal earnings, we found little evidence on the impact of daycare on maternal physical and mental health and social outcomes. Only the studies by Angeles and colleagues (Angeles et al. 2014) and Rosero and Oosterbeek (2011) included measures of maternal health. One other notable finding is that Calderon (2012) studies the impact on men, which few, if any other studies have done. Interestingly, she finds that increases in daycare availability have some impact on men's job switching and potentially a reduction in working. The impact of daycare programs on men and non-economic outcomes among women represent potential areas for future research.

One of the main challenges to estimating the impact of daycare on maternal outcomes is confounding (or selection into utilizing daycare services) by hard-to-measure maternal characteristics (Heckman 1974). Furthermore, it is often difficult to predict the direction of unmeasured confounding. It may be plausible that more educated women in higher status households have higher cognitive abilities, which are difficult to measure and could be correlated with use of daycare and labor market outcomes. This would likely lead to upwardly biased estimates of the effect of daycare on maternal outcomes if these women were likely to increase their labor force participation, hours, or earnings for reasons that cannot be measured. On the other hand, where some programs may be targeted toward poorer women, and poorer women may be most in need of daycare services, estimates of the impact of daycare could be biased downward if these women also tend to be less likely to work or to end up in lower wage jobs. Only one of the studies in our review was randomized (Barros et al. 2011), but a number of other studies were quasi-experimental. Notably, the studies that used observational designs without any attempt to identify plausibly exogenous variation in program exposure (Deutsch 1998; Hallman et al. 2005; Quisumbing et al. 2007; Nakahara et al. 2010; Du and Dong 2013) tended to find weaker evidence or null effects. But, as noted above, it may be difficult to detect the

direction of bias, as we found evidence of both upward (Kilburn et al. 2002) and downward (Berlinski and Galiani 2007) bias in naive analyses among papers with quasi-experimental study designs. Overall this suggests that observational studies without a clear and plausible strategy for identifying the impact of daycare (e.g. those using usual regression adjustment of observed characteristics), are likely to generate biased estimates of the impact of daycare programs on maternal outcomes.

Our review has limitations. We used broad search terms, multiple databases, and hand-searching of existing studies to identify as many studies as possible, but it remains possible that we may have missed some relevant studies. However, given our positive summary estimate it would take a precisely estimated negative or null study to fundamentally alter our conclusion, at least with respect to maternal employment. Many of the included studies assessed multiple outcomes (e.g., children's nutritional status) and most studies relied on maternal self-report for women's economic outcomes (labor force participation, earnings, hours worked, wages, etc.), which could lead to reporting bias. We found suggestive evidence of asymmetry in our funnel plot, but this may not necessarily be due to publication bias, and instead may reflect true heterogeneity or variation in study quality (Sterne et al. 2011). Given the heterogeneity detected in our random effects meta-analysis, the low power of tests for funnel plot asymmetry (Ioannidis and Trikalinos 2007), and the small number of studies included, there is not strong evidence suggestive of publication bias in our sample. This could also be a consequence of the fact that a number of the studies in our sample have not been published in peer-reviewed journals.

Overall we find moderate but heterogeneous evidence that interventions to increase access to formal daycare increase maternal labor force participation in low- and middle-income countries, primarily in Latin American contexts. Evidence on maternal earnings and health outcomes was limited and often conflicting. Although the funding and implementation of daycare programs must be tailored to local demands and infrastructure, our review suggests the potential for positive impacts on women's economic outcomes across a variety of settings.

## Acknowledgements

The authors are grateful to Julia McGarry for her assistance with this study. This work was carried out with financial support from the UK Government's Department of International Development (DFID) and the International Development Research Centre (IDRC), Canada. The views expressed herein are those of the authors and do not necessarily reflect those of DFID or IDRC. Nichole Austin was supported through a doctoral award from the Fonds de recherche du Quebec Sante (FRQS). Sam Harper was supported by at Chercheur Boursier Junior 2 award from the Fonds de recherche du Quebec Sante (FRQS). Arijit Nandi was supported by the Canada Research Chairs program.

## References


Angeles, G., Gadsden, P., Galiani, S., Gertler, P., Herrera, A., Kariger, P., et al. 2014. "The impact of daycare on maternal labour supply and child development in Mexico, 3ie Impact Evaluation Report 6." International Initiative for Impact Evaluation (3ie).

Attanasio, O. and M. Vera-Hernandez. 2004. "Medium- and long run effects of nutrition and child care: evaluation of a community nursery programme in rural Colombia." IFS report EWP04/06. The Institute for Fiscal Studies.

Barros, R., Olinto, P., Lunde, T., and M. Carvalho. 2011. "The impact of access to free childcare on women's labor market outcomes: evidence from a randomized trial in low-income neighborhoods of Rio de Janeiro." World Bank Economists' Forum.

Berlinski, S., and S. Galiani. 2007. "The effect of a large expansion of pre-primary school facilities on preschool attendance and maternal employment." *Labour Economics* 14(3): 665–680.

Berlinski, S., Galiani, S., and P. Gertler. 2009. "The effect of pre-primary education on primary school performance." *Journal of Public Economics* 93(1):219–234.

Berlinski, S., Galiani, S., and P.J. McEwan. 2011. "Preschool and maternal labor market outcomes: evidence from a regression discontinuity design." *Economic Development and Cultural Change* 59(2): 313–44.

Borenstein, M., Hedges, L.V., Higgins, J.P.T., and H.R. Rothstein. 2009. *Introduction to meta-analysis*. Chichester, U.K.: John Wiley & Sons.

Brown T.W., van Urk, F.C., Waller, R., and E. Mayo-Wilson. 2014. "Centre-based day care for children younger than five years of age in low- and middle-income countries." Cochrane Database Syst Review (9): CD010543.

Del Boca, D. 2015. *The impact of child care costs and availability on mothers' labor supply*. Herman Deleeck Centre for Social Policy: University of Antwerp.

Deutsch, R. 1998. *Does child care pay? Labor-force participation and earnings effects of access to childcare in the Favelas of Rio de Janeiro*. The Inter-American Development Bank, Washington, DC.

Du, F. and X.Y. Dong. 2013. "Women's employment and child care choices in urban China during the economic transition." *Economic Development and Cultural Change* 62(1): 131–155.

Calderon G. 2012. "What is Good for the Goose is Good for the Gander: The Effects of Child Care Provision in Mexico." Available at https://cddrl.fsi.stanford.edu/sites/default/files/GabrielaCalderon_ChildCare_June2012.pdf.

Egger M., Smith, G.D., Schneider, M., and C. Minder. 1997. "Bias in meta-analysis detected by a simple, graphical test." *BMJ* 315: 629–34.

Hallman, K., Quisumbing, A.R., Ruel, M., and B. de la Briere. 2005. "Mothers' work and child care: findings from the urban slums of Guatemala City." *Economic development and cultural change* 53(4): 855–885.

Heckman J.J. 1974. "Effects of child-care programs on women's work effort." *Journal of Political Economy* 82(2): S136–S163.

Higgins J.P.T., and S.G. Thompson. 2002. "Quantifying heterogeneity in a meta-analysis." *Statistics in Medicine* 21(11): 1539–58.

Ioannidis, J.P.A., Patsopoulos, N.A., and H.R. Rothstein. 2008. "Reasons or excuses for avoiding meta-analysis in forest plots." *BMJ* 336: 1413–5.

Ioannidis J.P.A., and T.A. Trikalinos. 2007. "The appropriateness of asymmetry tests for publication bias in meta-analyses: a large survey." *CMAJ* 176(8): 1091–6.

Kabeer, N. 2012. "Women's economic empowerment and inclusive growth: labour markets and enterprise development." *International Development Research Centre* 44(10): 1-70.

Kilburn, M.R., Datar, A. 2002. *The availability of child care centers in China and its impact on child care and maternal work decisions*. RAND Report.

Mateo Diaz, M., and L. Rodriguez Chamussy L. 2013. *Childcare and Women's Labor Participation: Evidence for Latin America and the Caribbean*. Inter-American Development Bank.

Nakahara, S., Poudel, K.C., Lopchan, M., Poudel, O.R., Poudel-Tandukar, K., and M. Ichikawa. 2010. "Differential effects of out-of-home day care in improving child nutrition and augmenting maternal income among those with and without childcare support: A prospective before–after comparison study in Pokhara, Nepal." *Health policy* 97(1): 16–25.

Nandi, A., Harper, S., and N. Austin. 2015. "Childcare and women's health, social, and economic outcomes in low- and middle-income countries: systematic review." Available at http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015014390

OECD. 2012. *Poverty Reduction and Pro-Poor Growth*. Organization for Economic Co-Operation and Development (OECD). Available at http://dx.doi.org/10.1787/9789264168350-en

Quisumbing, A.R., Hallman, K., and M.T. Ruel. 2007. "Maquiladoras and market mamas: Women's work and childcare in Guatemala City and Accra." *The Journal of Development Studies* 43(3): 420–455.

Rosero, J., and H. Oosterbeek. 2011. "Trade-offs between different early childhood interventions: Evidence from Ecuador." Tinbergen Institute Discussion Paper.

Sterne, J.A.C., Sutton, A.J., Ioannidis, J.P.A., Terrin, N., Jones, D.R. and J. Lau. 2011. "Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials." *BMJ* 343: d4002.

van Urk, F.C., Brown, T.W., Waller, R., and E. Mayo-Wilson. 2014. "Centre-based day care for children younger than five years of age in high-income countries." *Cochrane Database Syst Rev* (9): CD010544.

TABLE 1— CHARACTERISTICS OF REVIEWED STUDIES.

| Author | Country | Sample | Exposure type | Exposure contrast | Outcome (primary) | Design | Findings |
|---|---|---|---|---|---|---|---|
| Angeles (2014) | Mexico | 1573 households | Care-based, public | ITT: Programa de Estancias Infantiles para Apoyar a Madres Trabajadoras (PEI) beneficiaries vs. waiting list. | Maternal labor market participation and use of time | Pipeline design; OLS with daycare fixed effects | Probability of maternal employment increased by 0.18 in enrolled households (95% CI: 0.10, 0.26). Beneficiaries worked 6.9 more hours per week (95% CI 2.7, 11.0). No impact on maternal income, empowerment, stress or depression. |
| Attanasio (2004) | Columbia | 4689 households | Care-based, public | LATE: Hogares Comunitarios (HC) program. At least one child attending HC vs. none. | Female employment rates and hours of work | Instrumental variable | Enrollment increased the probability of maternal employment (.37, 95% CI: .25, .49), and maternal hours worked (75.3, 95% CI: 48.84, 101.76). |
| Barros (2011) | Brazil | 3777 households | Care-based, public | ITT: Daycare lottery (winners vs. losers). LATE: women induced to take up daycare because of lottery win (compliers). | Maternal labor market participation | RCT and Instrumental variable | Percentage of working mothers increased among recipients (ITT=4.2 points, 95% CI: 1.06-7.34, LATE = 9.6 points, 95% CI: 2.3, 16.9) |
| Berlinski (2007) | Argentina | 29,817 mothers | Education-based, public | ITT: Number of preschool places constructed per child aged 3-5 (each additional place). | Maternal employment | Differences in differences | Maternal employment increased by 14 percentage points per 1-unit increase in preschool rooms (.142, SE: .075). Imprecise effects on work hours. |
| Berlinski (2011) | Argentina | 22,974 mothers (with at least one child aged 4) | Education-based, public | LATE: Age eligibility for level 3 of preschool (4 year-olds born before vs. after July 1). | Maternal labor market outcomes | Regression discontinuity | Mothers of youngest 4-year olds who enroll in kindergarten were more likely to do any work (127, SE: .106). Full-time work (.191, SE: .104). Hours worked increased by 7.8 (SE: 4.6). |
| Calderon (2012) | Mexico | 2,162,860 woman-observations | Care-based, public | ITT: Programa de Estancias Infantiles para Apoyar a Madres Trabajadoras (PEI). Each additional daycare space per 10 children. | Maternal probability of working | Differences in differences with synthetic controls | Probability of maternal employment increased with each additional space per 10 children (.0015, SE: .003) |
| Deutsch (1998) | Brazil | 1720 households | Care-based, public and private | ITT: Access to formal daycare | Maternal labor force participation and earnings | Limited dependent variable models and reduced form/selectivity-corrected specifications for earnings | Increased access to daycare was associated with increased economic opportunities for mothers, and public financing (but not necessarily public provision) of services was associated with increased maternal earnings/employment: women who used "market" daycare experienced a higher return on earnings (.26) than those who use public care (.11) (standard errors not provided). |
| Du (2013) | China | 871 woman-years | Care- and education-based, public | ITT: Formal daycare. Community has a daycare vs. does not have a daycare | Maternal labor force participation and labor hour supply | Repeated cross-sections with community fixed effects. | Daycare availability increased maternal labor force participation by 10.5% (95% CI: 1.9, 19.1) and total work time by 5.3 hours per week (95% CI: 1.0, 9.6). |
| Hallman (2005) | Guatemala | 1363 households | Care-based, public and private | ITT: Cost of, and travel time to, formal childcare services (either public or private) | Maternal labor force participation in last 30 days; hours worked | Tobit and probit reduced form models | Median formal care prices did not have an impact on past-month maternal labor force participation (-1.3, 95% CI: -2.93, .33), but higher prices reduced the number of hours |

| Author | Country | Sample | Exposure type | Exposure contrast | Outcome (primary) | Design | Findings |
|---|---|---|---|---|---|---|---|
| | | | | | | | worked in the past month (-1127.94, 95% CI: -2310.06, -54.18). Median travel time slightly increased hours worked (9.90, 95% CI: -.37, 20.17). |
| Kilburn (2002) | China | 250 households | Care-based, public and private | ITT: Out of home daycare centers. Community has a daycare vs. does not have a daycare. | daycare utilization and maternal workforce participation | Difference in differences | Unadjusted results: childcare availability is associated with a 38 percentage point increase in maternal workforce (for wages) participation (95% CI: .13, .63). Adjusted results were weaker (0.23, 95% CI: -.01, 0.42). |
| Nakahara (2010) | Nepal | 150 mothers | Care-based, public | ITT: Out of home daycare centers | Maternal income and working hours | Prospective cohort; non parametric (Wilcoxon signed rank test). | Maternal median income increased from 57 to 67 rupees for mothers without preexisting childcare support at baseline (z=2.42), and from 141 to 150 for those without support (z=0.58). Working hours decreased from 6 to 4 for women without childcare support at baseline (z=-1.62), and increased from 11.7 to 12 for those with support (z=-0.19). No impact on employment. |
| Quisumbing (2007) | Ghana and Guatemala | 559 households (Ghana); 1363 mothers (Guatemala) | Care-based, public and private | Formal use of daycare (yes / no) from prediction equation | Maternal earnings, days worked | Retrospective cohort; OLS (bivariate probit), bootstrapped SEs | Daycare availability influences utilization (but not earnings) in Guatemala, and neither utilization nor earnings in Ghana. Effect of predicted use of formal care on total earnings (year 2000 USD) was 11.3 (95% CI: -86.3, 108.9) in Ghana and 31.7 (95% CI: -137.8, 201.1) in Guatemala. |
| Rosero (2011) | Ecuador | 2572 children (total); 889 in 39 childcare centers | Care and education-based, public | LATE: Fondo de Desarrollo Infantil (FODI) | Maternal labor force participation, depressive symptoms | Regression discontinuity | Daycare centers increased maternal probability of employment (.22, 95% CI: .01, .43), working hours (7.6h, 95% CI: -0.3, 15.5) and also increased maternal depression (.42 SDs, 95% CI: .05, .79). |

Note: CI=confidence interval; OLS=ordinary least squares; RCT=Randomized controlled trial; SD=standard deviation; SE=standard error.

FIGURE 1. FLOWCHART OF STUDY SELECTION.

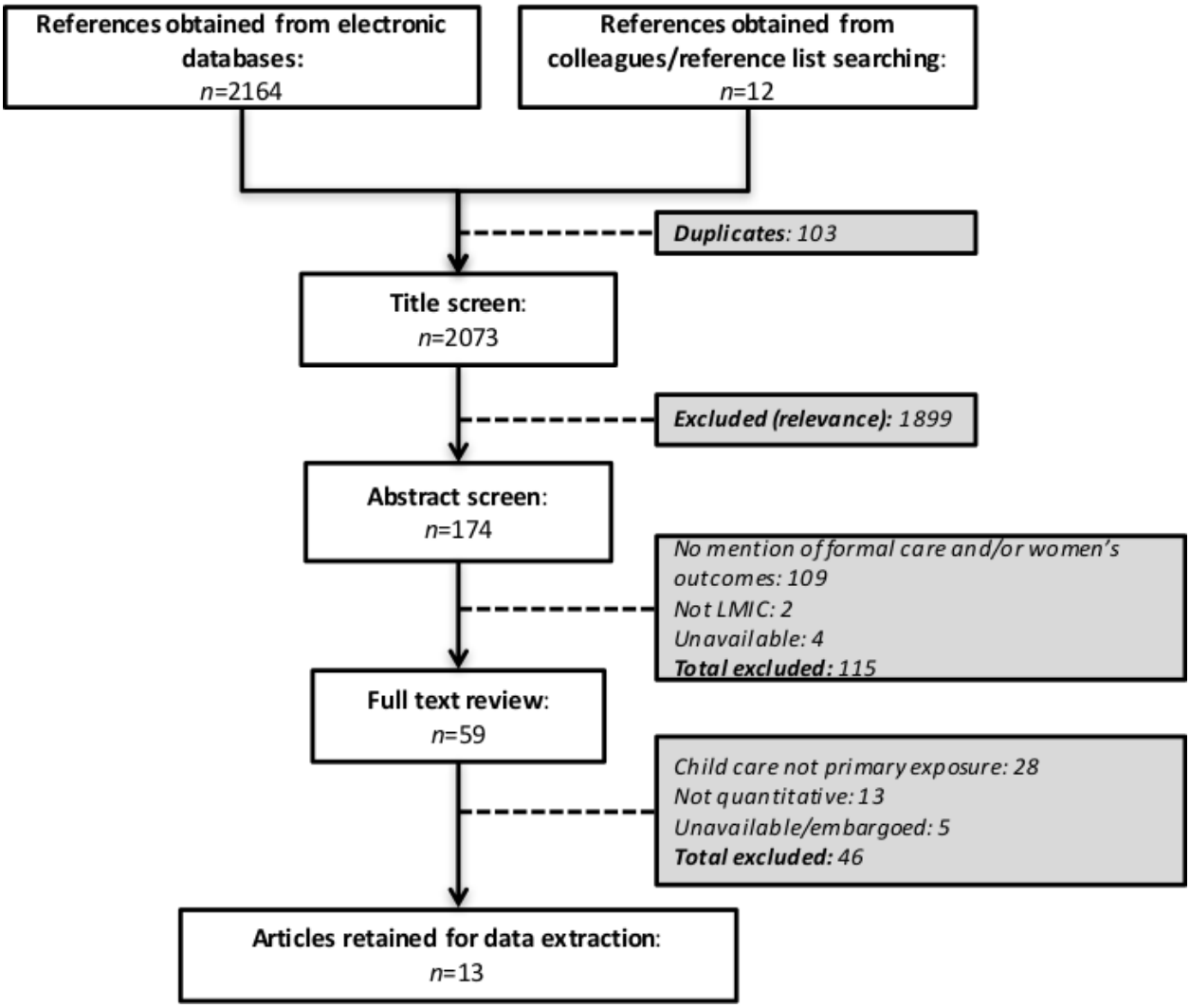


FIGURE 2. FOREST PLOT OF EFFECTS OF DAYCARE ON MOTHER'S LABOR SUPPLY FROM RANDOMIZED OR QUASI-EXPERIMENTAL STUDIES.

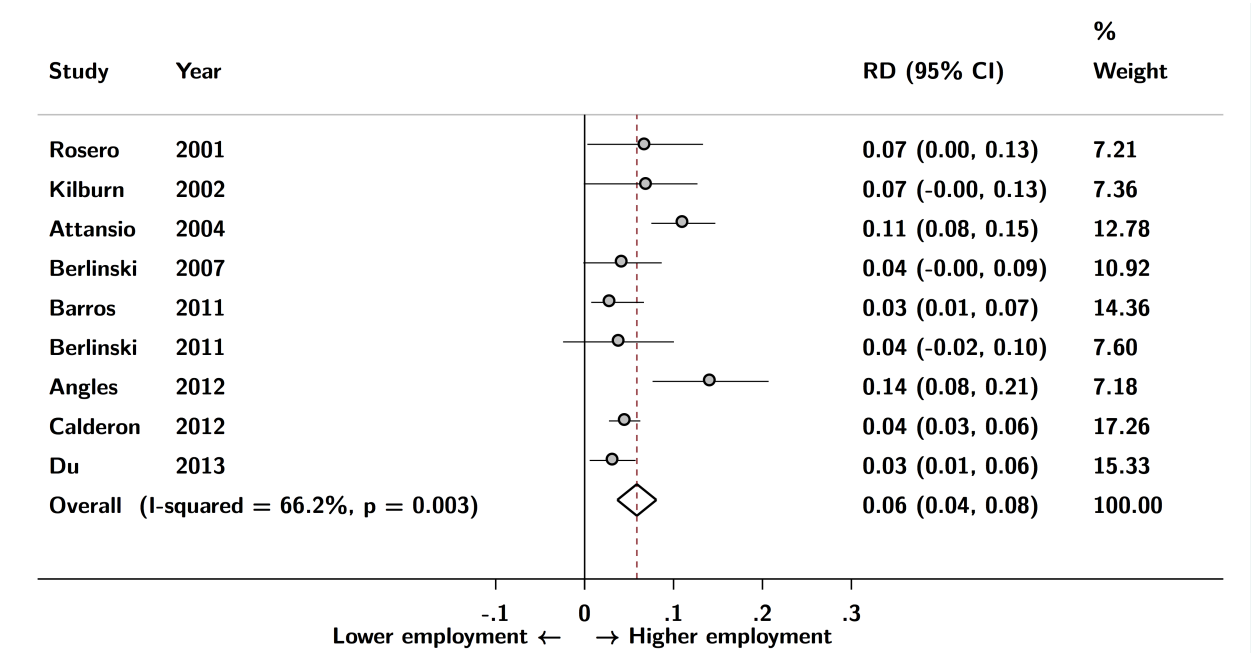
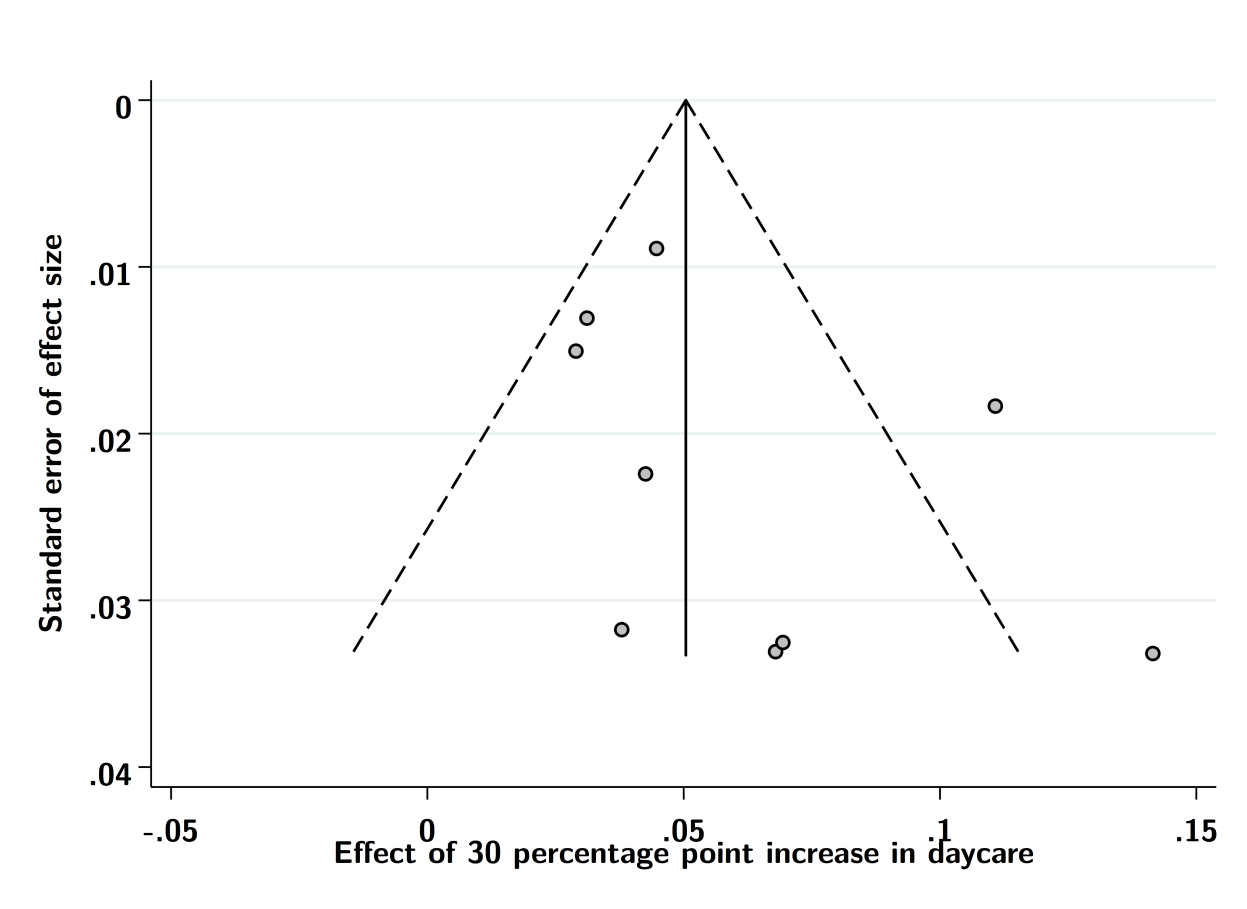


FIGURE 3. FUNNEL PLOT OF STUDY PRECISION VS. EFFECT SIZE WITH PSEUDO-95% CONFIDENCE LIMITS.



## Appendix A: Effect sizes for meta-analysis

Comparing and synthesizing the effect size for different treatments (or different scales of the same treatment) is a well known challenge in meta-analysis (Borenstein et al. 2009). Here, we provide a description of methods for attempting to put the systematic review results on similar scales. Generally speaking, our studies used 3 basic types of exposure contrasts: 1) comparing groups with and without access to daycare programs; 2) comparing the impact of adding some unit of daycare supply (e.g., new spots), and 3) comparing changes in access to daycare.

**Angeles (2012)**

Angeles et al. estimated that the probability of maternal employment increased in enrolled households by .178 (95% CI: 0.096-0.260). The treated and control groups differed by roughly 38 percentage points in their exposure to daycare, reported as 41.8% vs. 4.1%. We rescaled their coefficient to estimate the impact of a 30 percentage point increase in daycare, leading to an estimate of .178 / (0.418 - 0.041)*.30 = 0.142 percentage points. Applying the same transformation to the upper and lower limits of the 95% leads to bounds of 0.096 / (0.418 - 0.041)*.30=0.076 and .260 / (0.418 - 0.041)*.30=.207.

**Attanasio (2004)**

Attanasio et al. used an IV strategy to estimate the impact of current daycare attendance on maternal labor supply, effectively a contrast of 100% vs. 0%, for which they report that enrollment increased the probability of maternal employment by .37 (95% CI: .25, .49). Rescaling these estimates to a 30 percentage point increase in daycare exposure leads to estimates of .111 (95% CI: .047, .147).

**Barros (2012)**

We take a similar approach to Barros et al. and rescale their estimate for a 30 percentage point change: 4.2 / (0.94 - 0.51)*.30 = 2.93. Lower limit = 1.06 / (0.94 - 0.51)*0.30 = 0.740; Upper limit = 7.34 / (0.94 - 0.51)*.30 = 5.12.

**Berlinksi (2007)**

Berlinski and Galiani used a difference-in-differences strategy and estimate that Argentina's program of expanding pre-primary schools for children aged 3-5 increased the probability maternal employment. Specifically, they find that if the stock of new pre-primary school rooms increases from 0 to 1 and there is full take-up of the newly constructed places (i.e., 100% compliance), the likelihood of maternal employment would increase by 14 percentage points (0.142, SE: .075, 95% CI -0.005, 0.289). We rescale these estimates for a 30 percentage point increase in daycare exposure as 0.142*.30=0.0426 (-0.001, 0.087).

**Berlinksi (2011)**

Berlinski et al. used a regression discontinuity design to estimate the effect of pre-school attendance on maternal labor market outcomes. The report two-stage least squares estimates for a 100 percentage point increase in enrollment of 0.127 (SE: .106, 95% CI: -0.08, 0.33) for mother's labor force participation. For a 30 percentage point increase, we calculate estimates of 0.127*.30=0.0381, 95%CI: -0.024, 0.10).

**Calderon (2012)**

Calderon used difference-in-difference-in-differences and synthetic control strategies to estimate the impact of increases in and use the following exposure contrast: the estimated effects represent a response to having a 10 percentage point change in exposure in a municipality, i.e., moving from 0% to 10%. The intent-to-treat estimates on mother's probability of working is 0.015 (SE: 0.003, 95% CI: 0.009, 0.021). We rescale these impacts for a 30 percentage point increase, effectively multiplying the reported estimates by 3: 0.015 / (0.10 - 0)*.30 = 0.045, 95% CI: 0.027, 0.063)

**Du (2012)**

Du et al. used a fixed effects approach to estimate the impact of changes in the community supply of daycare on mother's labor supply. They estimated the impact of adding a daycare to a community, which implies a contrast of 100% vs. 0% access to daycare. They found that increases in daycare increased mother's labor force participation by 10.5 percentage points with a standard error of 4.4%, leading to a 95% CI of 1.876 to 19.124. We rescaled this coefficient to estimate the impact of a 30 percentage point increase in daycare, leading to an estimate of 10.5*.30 = 3.15 percentage points. Applying the same transformation to the upper and lower limits of the 95% leads to bounds of 0.5628 and 5.7372.

**Kilburn (2012)**

Kilburn estimate the effect of adding a community daycare (100% vs. 0% access): bivariate probit coefficient (SE): 0.699 (.362), implied 95% CI (-.011, 1.41). The average marginal effect is 23.2 percentage points. The authors do not provide confidence limits for the marginal effect, so we approximated the bounds by using the fact that the marginal effect is the product of the beta coefficient and the derivative of the cumulative distribution function[1]. Since the authors report the probit coefficient and the marginal effect, we can approximate the derivative as 0.232/0.699 = 0.3 and then convert the bounds of the reported probit coefficient to approximate the 95% confidence limits as -0.011*0.3=-0.003 and 1.41*0.3 = 0.423 percentage points. If we then scale these estimates for a 30% increase in access rather than a 100% increase in access we get 23.2*.30 = 6.96; Lower limit: -0.3*.30 = -0.9; Upper limit: 47.0*.30 = 12.69.

**Rosero (2011)**

Rosero and Oosterbeek used a very nearly sharp regression discontinuity design to estimate the impact of daycare on maternal and child outcomes. The used a cutoff for scoring applications to open daycare centers that led to 97% of those approved to have access to daycare centers and 0% for those not approved. They find exposure to daycare increased mother's labor force participation by 22 percentage points (SE .11, 95% CI 0.72 to 42.3). We rescaled their estimate for a 30 percentage point change: 21.5 / (0.969)*.30 = 6.66. Lower limit = 0.72 / (0.969)*0.30 = 0.224; Upper limit = 42.3 / (0.969)*.30 = 13.1.

[1] See the Stata website: http://www.stata.com/support/faqs/statistics/marginal-effects-methods/

## Appendix B: Stata code for evidence synthesis

```
* set global macro for current directory
global cdir `c(pwd)'

capture log close
log using daycare-sys-rev.txt, replace text

//  program:    daycare-sys-rev.do
//  task:             systematic review of daycare interventions in LMIC
//     input:         none
//     output:        none
//  project:    daycare systematic review
//  author:     sam harper \ 10apr2017

//  #0
//  program setup

version 14
set linesize 80
clear all
macro drop _all

* set global macro for current directory
global cdir `c(pwd)'


// #1
// input study data

clear
input study year est ll ul se param
1 2012 .178 .096 .260 . 0    // Angeles
2 2004 .370 .25 .49 . 1 1    // Attansio
3 2011 .042 .0106 .0734 . 0  // Barros
4 2007 .142 . . .075 0       // Berlinski 2009
5 2011 .127 . . .106 1       // Berlinski 2011
6 2012 .015 . . .003 0       // Calderon
7 2013 .105 .019 .191 . 0    // Du
8 2005 -.013 -.0293 .330 . 0 // Hallman
9 2002 .232 -0.0033 .423 . 0 // Kilburn
10 2001 .22 .01 .43 . 1      // Rosero

end

replace se = abs(ul - ll) / (2*invnorm(0.975)) if se==.
replace ul = est + invnorm(0.975)*se if ul==.
replace ll = est - invnorm(0.975)*se if ll==.

label var study "Study"
label var year "Year"
label var est "Estimate"
label var ul "Estimate 95% UL"
label var ll "Estimate 95% LL"
label var se "Std Err"



label define study 1 "Angles" ///
  2 "Attansio" 3 "Barros" ///
  4 "Berlinski" 5 "Berlinski" 6 "Calderon" ///
```

```
  7 "Du" 8 "Hallman" 9 "Kilburn" ///
  10 "Rosero", modify

label values study study

label define param 0 "ITT" 1 "LATE"
label values param param


// #2
// rescale effects to common exposure contrast (30% change in daycare)

gen es = .
gen esll = .
gen esul = .
label var es "effect of 30pp change in daycare"
label var esul "95% CI upper limit for es"
label var esll "95% CI lower limit for es"

* Angeles (94% treated vs. 51% control)
replace es = est / (0.418 - 0.041)*.30 if study==1
replace esll = ll / (0.418 - 0.041)*.30 if study==1
replace esul = ul / (0.418 - 0.041)*.30 if study==1

* Barros (94% treated vs. 51% control)
replace es = est / (0.94 - 0.51)*.30 if study==3
replace esll = ll / (0.94 - 0.51)*.30 if study==3
replace esul = ul / (0.84 - 0.51)*.30 if study==3

* Attansio, Berlinski (2009, 2011) Du, and Kilburn
* (100% treated vs. 0% control)
replace es = est / (1 - 0)*.30 if inlist(study,2,4,5,7,9)
replace esll = ll / (1 - 0)*.30 if inlist(study,2,4,5,7,9)
replace esul = ul / (1 - 0.)*.30 if inlist(study,2,4,5,7,9)

* Calderon (10% treated vs. 0% control)
replace es = est / (0.1 - 0)*.30 if study==6
replace esll = ll / (0.1 - 0)*.30 if study==6
replace esul = ul / (0.1 - 0)*.30 if study==6

* Rosero (96.9% treated vs. 0% control)
replace es = est / (0.969 - 0)*.30 if study==10
replace esll = ll / (0.969 - 0)*.30 if study==10
replace esul = ul / (0.969 - 0)*.30 if study==10



// #3
// random effects meta-analysis

* risk differences
*local ff = uchar(64256)
metan es esll esul, random ///
  label(namevar=study) lcols(study year) texts(150) ///
  effect("RD") nobox nowarning sortby(year)  ///
  favours(Lower employment {&larr}#{&rarr} Higher employment) ///
  graphregion(fcolor(white) lcolor(white)) ///
  ciopt(lwidth(vthin)) diamopt(lcolor(black)) ///
  pointopt(msymbol(circle) mcolor(black) msize(medsmall) mfcolor(gs12)) ///
  aspect(0.5) astext(55) xsize(6.5) xlabel(-.1,0,.1,.2,.3) ///
  name(memp, replace) title("", ///
```

```
  size(medium) pos(11) color(black))

* graph export fig2.pdf, replace
graph export fig2.tif, width(2250) replace

* 95% CI for I2
* See Borenstein et al. Introduction to Meta-Analysis, pp.124-5 for formulae.

sca B = 0.5 * (ln(r(het)) - ln(r(df))) / (sqrt(2*r(het)) - sqrt(2*r(df)-1))
sca L = exp(0.5 * ln(r(het)/r(df)) - 1.96*B)
sca U = exp(0.5 * ln(r(het)/r(df)) + 1.96*B)
sca LL = ((L^2 - 1) / L^2) * 100
sca UL = ((U^2 - 1) / U^2) * 100

disp "I2 (95% CI): " %3.1f r(i_sq) " (" %3.1f LL "," %3.1f UL ")"

* save effect size for funnel plot
gen double esize = r(ES)



// #4
// funnel plot to test for publication bias

* generate SE for effect size
gen double esse = abs(esul - esll) / (2*invnorm(0.975))

* get max SE for drawing pseudo 95% confidence limits
qui sum esse
gen double maxse = r(max)

* lower limit
gen double llp95 = esize - invnorm(0.975)*maxse
gen double ulp95 = esize + invnorm(0.975)*maxse

gen llslope = (0 - maxse) / (esize - llp95)
gen ulslope = (0 - maxse) / (esize - ulp95)


* funnel plot
metafunnel es esse, graphregion(fcolor(white) lcolor(white)) ///
  msymbol(circle) mcolor(black) msize(medsmall) mfcolor(gs12) ///
  clcolor(gs12) ylab(, angle(horizontal)) subtitle( ) ///
  ytitle("Standard error of effect size") ///
  xtitle("Effect of 30 percentage point increase in daycare")

* graph export "fig3.png", replace
graph export "fig3.tif", width(2250) replace


log close
exit
```

## Appendix C: Inclusion criteria by stage

| Stage | Screening criteria |
|---|---|
| **Stage 0:** Engine searches | ***Refer to search strings*** (excludes duplicates) |
| **Stage 1:** Title | **Date range**: No restrictions<br>**Study design**: No restrictions<br>**Analysis**: No restrictions<br>**Participants**: Should refer to women/mothers, or imply their inclusion<br>**Setting**: LMICs, as defined by the World Bank (as of end 2014)[1]<br>**Exposure**: Must mention some form of daycare/childcare/ECE<br>**Outcome**: Should refer to women's health/social/economic outcomes, but does not need to be explicit at this stage |
| **Stage 2:** Abstract | **Date range**: No restrictions<br>**Study design**: No restrictions<br>**Analysis**: No restrictions<br>**Participants**: Must mention women/mothers<br>**Setting**: LMICs, as defined by the World Bank (as of end 2014)[1]<br>**Exposure**: Must mention some form of daycare/childcare/ECE<br>**Outcome**: Must mention women's health/social/economic outcomes*<br><br>**When in doubt, retain for full text screen* |
| **Stage 3:** Full text | **Date range**: No restrictions<br>**Study design**: Original reports only (no reviews, policy statements, etc.)<br>**Analysis**: Quantitative (exclude if qualitative)<br>**Participants**: Mothers<br>**Setting**: LMICs, as defined by the World Bank (as of end 2014)[1]<br>**Exposure**: Daycare/childcare outside of the home, including ECE<br>**Outcome**: Women's health/social/economic outcomes (any quantitative measure(s))<br>**Exclude if**:<br>Children are older than 5<br>Caregivers are family members |

[1] Afghanistan, Albania, Algeria, Samoa, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia, Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Volta, Burundi, Cambodia, Cameroon, Cape Verde, Cabo Verde, Central African Republic, Chad, China, Colombia, Comoros, Congo, Zaire, Costa Rica, Cote d'Ivoire, Ivory Coast, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Korea, Kosovo, Kyrgyz Republic, Kyrgyzstan, Lao, Lebanon, Lesotho, Liberia, Libya, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Rwanda, Samoa, Sao Tome, Principe, Senegal, Serbia, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, Lucia, Vincent, Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Syria, Tajikistan, Tanzania, Thailand, Timor Leste, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank, Gaza, Yemen, Zambia, Zimbabwe

## Appendix D: Search strings by engine

**Ovid MEDLINE (1946-present)**

(*child day care centers OR *child care OR child, preschool OR infant care OR child daycare OR nurser$ OR nursery school$ OR pre-school$ OR preschool$ OR childcare OR day care$ OR early child$ education)

AND

((wome$ adj2 health) OR (wome$ adj2 disease$) OR (wome$ adj2 morbidity) OR (wome$ adj2 quality of life) OR (wome$ adj2 mental health) OR (wome$ adj2 depression) OR (wome$ adj2 fulfillment) OR (wome$ adj2 employment) OR (wome$ adj2 economic development) OR (wome$ adj2 income) OR (wome$ adj2 empowerment) OR (wome$ adj2 personal autonomy) OR (wome$ adj2 self concept) OR (wome$ adj2 self esteem) OR (wome$ adj2 freedom) OR (wome$ adj2 decision making) OR (woma$ adj2 health) OR (woma$ adj2 disease$) OR (woma$ adj2 morbidity) OR (woma$ adj2 quality of life) OR (woma$ adj2 mental health) OR (woma$ adj2 depression) OR (woma$ adj2 fulfillment) OR (woma$ adj2 employment) OR (woma$ adj2 economic development) OR (woma$ adj2 income) OR (woma$ adj2 empowerment) OR (woma$ adj2 personal autonomy) OR (woma$ adj2 self concept) OR (woma$ adj2 self esteem) OR (woma$ adj2 freedom) OR (woma$ adj2 decision making) OR (mother$ adj2 health) OR (mother$ adj2 disease$) OR (mother$ adj2 morbidity) OR (mother$ adj2 quality of life) OR (mother$ adj2 mental health) OR (mother$ adj2 depression) OR (mother$ adj2 fulfillment) OR (mother$ adj2 employment) OR (mother$ adj2 economic development) OR (mother$ adj2 income) OR (mother$ adj2 empowerment) OR (mother$ adj2 personal autonomy) OR (mother$ adj2 self concept) OR (mother$ adj2 self esteem) OR (mother$ adj2 freedom) OR (mother$ adj2 decision making) OR (maternal adj2 health) OR (maternal adj2 disease$) OR (maternal adj2 morbidity) OR (maternal adj2 quality of life) OR (maternal adj2 mental health) OR (maternal adj2 depression) OR (maternal adj2 fulfillment) OR (maternal adj2 employment) OR (maternal adj2 economic development) OR (maternal adj2 income) OR (maternal adj2 empowerment) OR (maternal adj2 personal autonomy) OR (maternal adj2 self concept) OR (maternal adj2 self esteem) OR (maternal adj2 freedom) OR (maternal adj2 decision making))

AND

(developing countr$ OR third world countr$ OR low income countr$ OR middle income countr$ OR developing natio$ OR third world nation$ OR Afghanistan OR Albania OR Algeria OR Samoa OR Angola OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Bulgaria OR Burkina Faso OR Volta OR Burundi OR Cambodia OR Cameroon OR Cape Verde OR Cabo Verde OR Central African Republic OR Chad OR China OR Colombia OR Comoros OR Congo OR Zaire OR Costa Rica OR Cote d'Ivoire OR Ivory Coast OR Cuba OR Djibouti OR Dominica OR Dominican Republic OR Ecuador OR Egypt OR El Salvador OR Eritrea OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guyana OR Haiti OR Honduras OR Hungary OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyz Republic OR Kyrgyzstan OR Lao OR Lebanon OR Lesotho OR Liberia OR Libya OR Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall Islands OR Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova OR Mongolia OR

Montenegro OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nepal OR Nicaragua OR Niger OR Nigeria OR Pakistan OR Palau OR Panama OR Papua New Guinea OR Paraguay OR Peru OR Philippines OR Romania OR Rwanda OR Samoa OR Sao Tome OR Principe OR Senegal OR Serbia OR Seychelles OR Sierra Leone OR Solomon Islands OR Somalia OR South Africa OR South Sudan OR Sri Lanka OR Lucia OR Vincent OR Grenadines OR Sudan OR Suriname OR Swaziland OR Syrian Arab Republic OR Syria OR Tajikistan OR Tanzania OR Thailand OR Timor Leste OR Togo OR Tonga OR Tunisia OR Turkey OR Turkmenistan OR Tuvalu OR Uganda OR Ukraine OR Uzbekistan OR Vanuatu OR Venezuela OR Vietnam OR West Bank OR Gaza OR Yemen OR Zambia OR Zimbabwe)

---

**Pubmed (1946-present; restricted to hits not in MEDLINE)**

("child day care centers"[Majr] OR "child care"[Majr] OR "child, preschool" OR "infant care" OR child daycare OR nurser* OR nursery school* OR pre-school* OR preschool* OR childcare OR day care* OR "early childhood education")

AND

((health OR disease* OR morbidity OR "quality of life") OR ("mental health" OR depression OR fulfillment) OR (employment OR "economic development" OR income) OR (empowerment OR "personal autonomy" OR "self concept" OR freedom OR "decision making"))

AND

(woman* OR women* OR mother* OR maternal)

AND

(developing countr* OR third world countr* OR low income countr* OR middle income countr* OR developing nation* OR third world nation* OR Afghanistan OR Albania OR Algeria OR Samoa OR Angola OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Bulgaria OR Burkina Faso OR Volta OR Burundi OR Cambodia OR Cameroon OR Cape Verde OR Cabo Verde OR Central African Republic OR Chad OR China OR Colombia OR Comoros OR Congo OR Zaire OR Costa Rica OR Cote d'Ivoire OR Ivory Coast OR Cuba OR Djibouti OR Dominica OR Dominican Republic OR Ecuador OR Egypt OR El Salvador OR Eritrea OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guyana OR Haiti OR Honduras OR Hungary OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyz Republic OR Kyrgyzstan OR Lao OR Lebanon OR Lesotho OR Liberia OR Libya OR Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall Islands OR Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova OR Mongolia OR Montenegro OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nepal OR Nicaragua OR Niger OR Nigeria OR Pakistan OR Palau OR Panama OR Papua New Guinea OR Paraguay OR Peru OR Philippines OR Romania OR Rwanda OR Samoa OR Sao Tome OR Principe OR Senegal OR Serbia OR Seychelles OR Sierra Leone OR Solomon Islands OR Somalia OR South Africa OR South Sudan OR Sri Lanka OR Lucia OR Vincent OR Grenadines OR Sudan OR Suriname OR Swaziland OR Syrian Arab Republic OR Syria OR Tajikistan OR Tanzania OR Thailand OR Timor Leste OR Togo OR Tonga OR

Tunisia OR Turkey OR Turkmenistan OR Tuvalu OR Uganda OR Ukraine OR Uzbekistan OR Vanuatu OR Venezuela OR Vietnam OR West Bank OR Gaza OR Yemen OR Zambia OR Zimbabwe)

AND

publisher[sb]

---

**EconLIT (1946-present)**

(child w care OR infant w care OR daycare OR day w care OR nurseries OR nursery w school+ OR pre-school+ OR preschool+ OR early w childhood w education)

AND

((health OR disease+ OR morbidity OR quality w of w life) OR (mental w health OR depression OR fulfillment) OR (employment OR economic w development OR income) OR (empowerment OR autonomy OR self w concept OR self w esteem OR freedom OR decision w making))

AND

(woman OR women OR mother OR maternal)

AND

(developing w countr* OR third w world w countr* OR low w income w countr* OR middle w income w countr* OR developing w nation+ OR third w world w nation+ OR Afghanistan OR Albania OR Algeria OR Samoa OR Angola OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Bulgaria OR Burkina w Faso OR Volta OR Burundi OR Cambodia OR Cameroon OR Cape w Verde OR Cabo w Verde OR Central w African w Republic OR Chad OR China OR Colombia OR Comoros OR Congo OR Zaire OR Costa w Rica OR Côte d'Ivoire OR Ivory w Coast OR Cuba OR Djibouti OR Dominica OR Dominican w Republic OR Ecuador OR Egypt OR El w Salvador OR Eritrea OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guyana OR Haiti OR Honduras OR Hungary OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyz w Republic OR Kyrgyzstan OR Lao OR Lebanon OR Lesotho OR Liberia OR Libya OR Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall w Islands OR Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova OR Mongolia OR Montenegro OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nepal OR Nicaragua OR Niger OR Nigeria OR Pakistan OR Palau OR Panama OR Papua w New w Guinea OR Paraguay OR Peru OR Philippines OR Romania OR Rwanda OR Samoa OR São w Tomé OR Principe OR Senegal OR Serbia OR Seychelles OR Sierra Leone OR Solomon w Islands OR Somalia OR South w Africa OR South w Sudan OR Sri w Lanka OR Lucia OR Vincent OR Grenadines OR Sudan OR Suriname OR Swaziland OR Syrian Arab Republic OR Syria OR Tajikistan OR Tanzania OR Thailand OR Timor-Leste OR Togo OR Tonga OR Tunisia OR Turkey OR Turkmenistan OR Tuvalu OR Uganda OR Ukraine OR Uzbekistan OR Vanuatu OR Venezuela OR Vietnam OR West w Bank OR Gaza OR Yemen OR Zambia OR Zimbabwe)

**PsycINFO (1967-present)**

(child care OR infant care OR child daycare* OR child daycare cent* OR nurser* OR nursery school* OR pre-school* OR preschool* OR childcare OR day care OR early childhood education)

AND

((health OR disease* OR morbidity OR quality of life) OR (mental health OR depression OR fulfillment) OR (employment OR economic development OR income) OR (empowerment OR personal autonomy OR self concept OR self esteem OR freedom OR decision making))

AND

(woman* OR women* OR mother* OR maternal)

AND

(developing countr* OR third world countr* OR low income countr* OR middle income country* OR developing nation* OR third world nation* OR Afghanistan OR Albania OR Algeria OR Samoa OR Angola OR Argentina OR Armenia OR Azerbaijan OR Bangladesh OR Belarus OR Belize OR Benin OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Botswana OR Brazil OR Bulgaria OR Burkina Faso OR Volta OR Burundi OR Cambodia OR Cameroon OR Cape Verde OR Cabo Verde OR Central African Republic OR Chad OR China OR Colombia OR Comoros OR Congo OR Zaire OR Costa Rica OR Cote d'Ivoire OR Ivory Coast OR Cuba OR Djibouti OR Dominica OR Dominican Republic OR Ecuador OR Egypt OR El Salvador OR Eritrea OR Ethiopia OR Fiji OR Gabon OR Gambia OR Georgia OR Ghana OR Grenada OR Guatemala OR Guinea OR Guyana OR Haiti OR Honduras OR Hungary OR India OR Indonesia OR Iran OR Iraq OR Jamaica OR Jordan OR Kazakhstan OR Kenya OR Kiribati OR Korea OR Kosovo OR Kyrgyz Republic OR Kyrgyzstan OR Lao OR Lebanon OR Lesotho OR Liberia OR Libya OR Macedonia OR Madagascar OR Malawi OR Malaysia OR Maldives OR Mali OR Marshall Islands OR Mauritania OR Mauritius OR Mexico OR Micronesia OR Moldova OR Mongolia OR Montenegro OR Morocco OR Mozambique OR Myanmar OR Namibia OR Nepal OR Nicaragua OR Niger OR Nigeria OR Pakistan OR Palau OR Panama OR Papua New Guinea OR Paraguay OR Peru OR Philippines OR Romania OR Rwanda OR Samoa OR Sao Tome OR Principe OR Senegal OR Serbia OR Seychelles OR Sierra Leone OR Solomon Islands OR Somalia OR South Africa OR South Sudan OR Sri Lanka OR Lucia OR Vincent OR Grenadines OR Sudan OR Suriname OR Swaziland OR Syrian Arab Republic OR Syria OR Tajikistan OR Tanzania OR Thailand OR Timor Leste OR Togo OR Tonga OR Tunisia OR Turkey OR Turkmenistan OR Tuvalu OR Uganda OR Ukraine OR Uzbekistan OR Vanuatu OR Venezuela OR Vietnam OR West Bank OR Gaza OR Yemen OR Zambia OR Zimbabwe)