

Protocol: Adult-child ratio and group size in daycare: A systematic review of qualitative research

Introduction and objectives

Worldwide, a large number of children are enrolled in formal non-parental early childhood education or care (ECEC). Formal early childhood education or care is defined as professional early childcare or education settings with paid caretakers or teachers as opposed to more informal arrangements such as private babysitters or caretakers belonging to the child's extended family. On average across OECD countries, around 33% of children aged 0-2 are enrolled in early childhood education or care, but this ranges from lower than 1% in Turkey to as high as roughly 60% in Belgium and Denmark. For children aged 3-5 the enrolment rates are even higher, with an average of 87,2 % across the OECD¹.

Average hours in ECEC also differ across countries. In most OECD countries, children (0- to- 2-year-olds) in ECEC attend for an average of somewhere between 25 and 35 hours during a usual week, with the OECD average just under 30 hours per week. An overall average is not available for 3-5-year-olds in the OECD countries, but in Denmark children aged 3-5 years spend an average of 7.5 hour each day in kindergarten². In the developing countries, attendance in formal childcare is also increasing. In the past 20 years, at least 13 developing countries have instituted compulsory preschool or pre-primary programmes (Engle et al., 2011), and according to The World Bank, roughly half of all children in the relevant age range around the globe were enrolled in preschool in 2017³.

With a growing number of children spending a substantial number of hours every day in non-parental care, it is vitally important that the conditions experienced by children in ECEC settings are conducive to the positive and full development of each child. The importance of early life experiences on a child's future development and wellbeing is widely recognized and cannot be underestimated, as a future healthy development is built on the foundations established early on in life (Heckman, 2006, 2007; High, 2008; Knudsen, Heckman, Cameron, & Shonkoff, 2006; Berlin,

¹ https://www.oecd.org/els/soc/PF3_2_Enrolment_childcare_preschool.pdf

² <https://www.boerneraadet.dk/media/30309/Miniboernepanel-Mellem-hjem-og-boernehave.pdf>

³ <https://data.worldbank.org/indicator/SE.PRE.ENRR>

Brooks-Gunn, McCarton, & McCormick, 1998). Quality of care in ECEC may be defined by both structural and process characteristics (Vermeer, van Ijzendoorn, Cárcamo, & Harrison, 2016). Structural characteristics include the adult/child ratio, group size, the formal educational level of staff, years of working experience, and in-service professional development of caretakers/teachers, as well as the physical child care facilities available (Slot, Leseman, Verhagen, & Mulder, 2015). Process characteristics include caretaker sensitivity and quality of child-caretaker interaction (de Schipper, Riksen-Walraven, & Geurts, 2006). Structural and process characteristics are associated with each other (NICHD, 1996), and both structural and process characteristics have been linked to positive child outcomes (Auger, Farkas, Burchinal, Duncan & Vandell, 2014; Burchinal, Cryer, Clifford, & Howes, 2002; Burchinal, Roberts, Nabors, & Bryant, 1996; Howes, Phillips, & Whitebook, 1992; Phillips, Mekos, Scarr, McCartney, & Abbott–Shim, 2000). However, some studies have also failed to find a positive association between e.g. a higher adult/child ratio and positive child outcomes (Clarke-Stewart, Gruber, & Fitzgerald, 1994; Dunn, 1993; Mashburn, Pianta, & Hamre, 2008) or have reported mixed results (Howes, 1997).

Structural characteristics of the quality of childcare are readily observable and easier to regulate than process characteristics. However, the available knowledge on the impact of different aspects of structural characteristics on both process characteristics and child outcomes remains limited and uncertain, presenting decision makers on all levels with significant challenges, which are likely to be exacerbated by budgetary constraints. The current review aims at strengthening the knowledge base and providing a clearer picture of the impact of two central structural characteristics, adult/child ratio and group size, on different aspects of child development and well-being. In an associated ongoing review and meta-analysis of quantitative studies, we perform a statistical analysis of ratio and group size effects (Dalgaard, Bondebjerg, Klokke, Viinholt, & Dietrichson, 2020), whereas this review will examine the knowledge created in the qualitative literature. In this investigation, our interest lies in exploring in-depth the experiences of children and caregivers with the structural characteristics present in various daycare settings. What issues related to adult-child ratio and group size are seen as important by children and caregivers who spend their everyday lives in ECEC settings? It is our hope that the united results of these two separate systematic reviews will support decision makers and practitioners in facilitating the positive development and well-being of children attending ECEC.

Previous studies on adult-child ratio and group size in ECEC

Theoretically, higher adult/child ratios (fewer children per adult) and smaller group sizes are hypothesized to increase both the extent and quality of adult/child interactions in daycare. The younger the children, the more their development and well-being are assumed to be dependent on adequate, nurturing and stimulating adult/child interactions. Thus, the extent and quality of adult/child interactions is by some scholars proposed to be the single most important determinant of child development and well-being in ECEC settings (de Schipper, Riksen-Walraven, & Geurts, 2006; Christoffersen, Højen-Sørensen, & Laugesen, 2014; Lamb, 1998; Karoly, 1998; Munton et al., 2002; Vandell & Wolfe, 2000). A number of studies suggest that when the adult/child ratio is increased (fewer children per adult) and group sizes are decreased, the number of interactions between children and adults increases, and the exchanges become more stimulating and nurturing. Thus, caregivers with fewer children in their care have been found to be more sensitive, responsive, warm, nurturing and encouraging towards the children. Furthermore, a higher adult/child ratio has been found to be associated with adults exhibiting more positive and less negative affect, and with adults who provide more varied and developmentally appropriate activities for the children.

Conversely, previous studies suggest that when fewer adults are in charge of larger groups of children, caregivers become more focused on managing and controlling the children's behaviour. This means that the adults issue more commands and corrections, exert more negative control, and spend less time engaged in reciprocal conversations or playful interactions with the children. With lower ratios (more children per adult) and larger group sizes, the adults are more likely to ignore or overhear children's questions, and they spend less time engaged in positive affirmation. Furthermore, early studies suggest that with lower ratios and higher group sizes, children experience more conflicts during free play situations, leading the adults to spend more time on acute problem solving and "putting out fires" (Dawe, 1934; Christoffersen, Højen-Sørensen, & Laugesen, 2014; Gevers Deynoot-Schaub & Riksen-Walraven, 2005; Ghazvini & Mullis, 2002; Howes, 1983, 1997; Howes & Rubenstein, 1985; Howes, Smith, & Galinsky, 1995; NICHD ECCRN, 1996, 2000; Roudinesco & Appel, 1950; Palméus & Hägglund, 1991; Phillipsen et al., 1997; Sjølund, 1969; Stallings & Porter, 1980; Volling & Feagans, 1995; Williams & Mattson, 1942).

Previous studies have also found adult child/ratio and group size to be associated with positive child outcomes such as decreased levels of anxiety, aggressive behaviour and distress, greater social competence and better receptive and expressive language skills (Burchinal et al., 1996; Vernon-Feagans, Manlove, & Volling, 1996; Volling & Feagans, 1995). Theoretically, this may be explained

by both the quality and frequency of the adult/child interactions. However, some scholars also suggest that a smaller group size regardless of the adult/child ratio may be beneficial to the group dynamic and may decrease children's stress levels (Christoffersen, Højen-Sørensen, & Laugesen, 2014).

In a large-scale study in the US (The National Day Care Study), data from 64 day care centres was collected between 1974-1978. Results suggested that for children aged 3-5 years of age, smaller groups had a positive impact on children's development and behaviour, even when the adult/child ratio was the same. Thus, children in smaller groups consisting of 12-14 children with 1-2 adults did better than children in larger groups consisting of 24-28 children with 4 adults on measures of behaviour and school readiness. Children in smaller groups were more cooperative, less aggressive, and had fewer conflicts compared with children in larger groups. Also, more positive adult/child interaction occurred in smaller groups, even when the adult/child ratio was the same as in larger groups. The same findings did not apply to children aged 0-2; for these children, both adult/child ratio and group size was associated with positive child outcomes (Ruopp, Travers, Glantz, & Coelen, 1979a; Ruopp, Travers, Glantz, Coelen, & Smith, 1979b).

However, findings regarding the impact of adult/child ratio and group size are far from unequivocal, as a number of observational studies have failed to find significant positive associations between adult/child ratio and group size and process quality characteristics or child outcomes (Pessanha, Aguiar, & Bairrao, 2007; Pianta et al., 2005; Barros & Anguiar, 2010; Fukkink, Gevers Deynoot-Schaub, Helmerhorst, Bollen, & Riksen-Walraven, 2013; Vermeer et al., 2008).

Issues related to adult/child ratio and group size have also been explored in the qualitative literature, shedding light on the perspectives of children and daycare staff. The initial desktop searches made for this protocol have primarily revealed studies performed in Scandinavian daycare contexts, some of which will be presented in the following section.

As part of a Swedish research project entitled "The impact of group size on children's affordances in preschool", a number of articles have been published exploring preschool teachers' perceptions of group size in day care. In Samuelsson, Williams, & Sheridan (2015), preschool teachers' views on working with the content areas of the Swedish preschool curriculum, depending on the size of the

child group, were explored. In interview and survey statements, preschool teachers expressed that group size had an impact on the pedagogical choices made concerning content areas and work methods. When there were fewer children in the group, or when it was possible to subdivide children into smaller groups, teachers had better opportunities for working in line with the intentions of the curriculum. Organizing a large group was seen as challenging, in part because if the overall number of children in the group increased, even the smaller subdivided groups may be too large to work with particular content areas or methods where close adult interaction was needed. Secondly, some children in the group may need more care and attention (e.g. younger preschool children), meaning that teachers may not be able to follow the needs, interests and learning capacities of every individual child. In some cases, this may lead teachers to abstain from working with particular content areas or activities that demanded close adult contact or supervision, or to simplify content, hindering in-depth exploration.

In another study by the same authors (Sheridan, Williams, & Samuelsson, 2014), preschool teachers' perceptions of appropriate group sizes were shown to be shaped by a number of interacting aspects, including age and gender of the children, the combination of children in the group, whether the children had special needs, what activities were to take place, what were the objects of learning, the staff-child ratio, and the physical environment. As an example, groups could be larger if children were older or playing together, singing, doing gymnastics and the like. Younger children and more focused learning required smaller groups. The participating teachers found it difficult to connect with and engage with individual children in close interaction in larger groups. In contrast, smaller groups created possibilities for closer, sustained interaction and for teachers to be attentive and build on emerging learning situations. According to the teachers, less confident children struggled in larger groups and were in danger of becoming invisible. Moreover, in larger groups, adult attention and help was mostly provided to those who asked for it, leading e.g. older children to be neglected, since the younger children needed more attention. According to the teachers in this study, larger groups made it harder to follow the intentions of the curriculum. With too many children in a group, teachers were focused on solving instant problems and providing basic safety and care, making it difficult to create learning opportunities. Small group organization was seen as a way for teachers to deal with large numbers of children, but the study showed that teacher-organised groupings for the most part only took place for a limited amount of the preschool day.

Another example of a Scandinavian research study on group size is found in Norway, where the “Searching for qualities” research group has investigated aspects of quality in ECEC for children under the age of three years. In a qualitative sub-project to this, Eide, Winger, Wolf, & Dahle (2017) studied the well-being of the youngest preschool children placed in either traditional small groups or large, flexible groups, revealing variations in relational quality depending on group size and group stability. The authors found more interplay between children in smaller, stable groups where children were familiar with each other. In some groups, child-to-child interaction was characterized by short, random encounters, particularly during free play periods in large rooms with many children and few play materials. Some children were defined by the authors as “wanderers”, i.e. children who had limited contact with other children and staff, and who were seen to either actively explore on their own or to be passive observers. More “wanderers” were found in large groups of children. In addition, group size seemed to impact on staff interplay with the children, in the sense that in large groups, staff took on a more supervisory role and intervened only if special situations arose or children were in need of comfort. Furthermore, large groups seemed to entail a diminished focus on building a sense of collectiveness and a sense of the importance of the group to the individual child. In smaller, stable groups, authors observed a focus on collectiveness when e.g. staff and children looked at photos and spoke about common experiences and friends.

The three qualitative studies presented here point to a number of difficulties experienced by teachers and children in large preschool groups in Scandinavia. It is our hope that the extensive searches performed in this review will shed light on many more perspectives on group size and adult/child ratios in daycare, as there are experienced by children and teachers not just in Scandinavia, but also elsewhere in the world.

Other systematic reviews on adult-child ratio and group size in ECEC

Perlman et al. (2017) conducted a systematic review and meta-analysis of quantitative studies exploring the impact of child-staff ratios in ECEC settings on child outcomes. Furthermore, Carlsson, Samuelsson, & Kärrby (2001) authored a knowledge overview of the impact of structural factors on daycare pedagogical quality, including both qualitative and quantitative studies. Other overviews have also examined factors related to day care quality or the effects of daycare on child development, such as Sjølund (1969) and Christoffersen, Højen-Sørensen, & Laugesen (2014). However, to our knowledge, no previous systematic review has been performed focusing exclusively on qualitative studies of adult/child-ratio and group size in daycare. The current systematic review will contribute with an up-to-date, systematic review, employing extensive

literature searches and performing a thematic analysis guided by distinctively qualitative analytical procedures, e.g. through the use of line-by-line inductive coding.

Methods

Types of studies and outcomes

We define ECEC as professional settings with paid caretakers or teachers enrolling children aged 0-5 years old, thus excluding informal care arrangements such as private babysitters or family members as well as residential care arrangements such as foster families or institutions. In order to gain a detailed insight into issues related to adult-child ratio and group size in ECEC settings, we will include all types of qualitative studies that collect empirical data and provide descriptions of main methodological issues such as sampling, data collection procedures, and type of data analysis. Eligible qualitative studies may apply a wealth of data collection methods including but not limited to participant observations, in-depth interviews, and focus groups. Eligible studies must explore issues of adult/child ratio and group size as they relate to process characteristics of quality, child outcome measures, and child and caretaker experiences. We will not define a final list of outcomes in advance, but will remain open to what constitutes itself as relevant in the studies located. However, we will provide a few examples of what may be perceived as relevant outcomes:

Process characteristics of quality may relate to areas such as: caregiver/child interaction, positive/negative affect, caregiver sensitivity, responsiveness, warmth, and nurturing behaviour. Examples of *child outcomes* are developmental data on language, motor, or interpersonal skills, child mental and physical health, child well-being, prosocial behaviour and psychological adjustment, pre-math and pre-literacy.

Finally, the *experiences of children and caretakers* in ECEC settings may relate to areas such as well-being, secure attachment and positive relationships, or the opportunities available to work with developmentally rich activities or areas of learning as defined in e.g. national curricula.

Search methods for identification of studies

Relevant qualitative studies have been located in the search carried out in the ongoing quantitative review and meta-analysis (for details on the search, see Dalgaard, Bondebjerg, Klokke, Viinholt, &

Dietrichson, 2020). In addition to this, references have been located in a number of searches conducted by researchers at The Danish School of Education, Aarhus University. Search strings for these searches may be provided at request. All references found will be placed in a separate review in EPPI-Reviewer 4 for screening and data extraction.

Screening

Under the supervision of review authors, two review team assistants will first independently screen titles and abstracts to exclude studies that are clearly irrelevant. Studies considered eligible by at least one assistant or studies where there is insufficient information in the title and abstract to judge eligibility will be retrieved in full text. The full texts will then be screened independently by two review team assistants under the supervision of the review authors. Any disagreement of eligibility will be resolved by the review authors. Exclusion of studies that otherwise might be expected to be eligible will be documented and presented in an appendix.

The study inclusion criteria will be piloted by the review authors (see Appendix: *First and second level screening*). The overall search and screening process will be illustrated in a flow diagram. None of the review authors will be blind to the authors, institutions, or journals responsible for the publication of articles.

Data extraction

We will extract data for the thematic synthesis using a data extraction form that will be developed by the research team and imported into EPPI-Reviewer 4. The information extracted will concern the study context and participants, the design and methods used, as well as the research findings. As discussed by Thomas & Harden (2008) and Noyes & Lewin (2011a), determining what constitutes “findings” in qualitative studies is not always straight forward. It is for the researcher to decide on clear criteria for what is to be considered “a finding”. In Thomas & Harden (2008), a choice is made to take findings to be all text labelled as “Results”, “Findings” or “Analysis” and to import all such text into a qualitative analysis software package. In the current review, we will define “findings” in a similar way to Thomas & Harden (2008) and draw on the functionalities developed in EPPI-Reviewer 4 for inductive coding of textual data.

Critical appraisal of included studies

All qualitative studies will be independently appraised by two reviewers in order to assess whether or not they should be included in the thematic synthesis. This means that studies will be double coded, after which the two reviewers will discuss their assessments and reach a final conclusion on whether to include a given study in the synthesis. In case of disagreements that cannot be reconciled between the two reviewers, a third reviewer will assess the study and make the final decision on inclusion. We will only include studies for thematic synthesis that pay sufficient attention to qualitative research standards for credibility, transferability, dependability, and confirmability (Hannes, 2011). We will critically appraise qualitative studies using an adapted version of the JBI Critical Appraisal Checklist for Qualitative Research, developed by the Joanna Briggs Institute (Joanna Briggs Institute, 2017, and Lockwood, Munn, & Porritt, 2015). This checklist includes 10 questions that lead to an overall appraisal of “include”, “exclude”, or “seek further info”. The 10 questions take integral parts of the qualitative methodological process into consideration, such as the congruity between the choice of research methodology and the research objectives, the influence of the researcher on the research, and the flow of conclusions from the analysis or interpretation of data. In the original checklist, the questions are checked in boxes indicating “yes”, “no”, “unclear” or “not applicable”. In this review, reviewers will further be required to justify their choice of “yes”, “no”, “unclear” or “not applicable” in a comment box. This is done by importing the checklist into EPPI-Reviewer 4 and adding comment boxes. Reviewers will also be required to justify their overall appraisal assessment. The reason for demanding justifications in addition to ticking the boxes is founded in a wish to both ensure high methodological rigour and detail in the assessment and facilitate discussion between reviewers on whether to include or exclude studies for synthesis. All critical appraisals of qualitative studies will be performed in EPPI-Reviewer 4, where comparisons can also be made between reviewer assessments (see appendix for an extraction of the checklist from EPPI-Reviewer 4).

Thematic synthesis

We will conduct a thematic synthesis following the procedures presented in Thomas & Harden (2008). A thematic synthesis has three stages, which are interwoven and to an extent overlapping. In the first stage, research findings are subjected to free inductive line-by-line coding, informed by usual guidelines for thematic analysis in primary qualitative research. In this process, every sentence is applied with one or more codes, and with each new study, reviewers can draw on already existing codes, or add new ones, leading to the production of a “code bank” and the beginning of a translation of concepts between studies (Thomas & Harden, 2008). The inductive

coding will be performed by the review authors in the following manner: All review authors individually code all eligible studies using the line-by-line coding functionality in EPPI-Reviewer 4. In cases where reviewers have used similar codes, a common wording may be chosen, and a united code bank is produced which includes the total amount of inductive codes generated by the reviewers. Before completing this stage of the synthesis, the authors will examine all text supplied with a given code in order to check for coding consistency and to add additional codes if needed (Ibid.).

In stage two of the thematic synthesis, review authors will group the inductive codes into related areas in order to construct descriptive themes, staying close to the primary studies. This will be done first individually by each of the review authors, and then in unison. This same procedure will be used in the final stage, where the descriptive themes are translated into higher-order analytical themes that go beyond the primary data, allowing for the generation of new understandings and hypotheses (Thomas & Harden, 2008). The goal here will be to generate analytical themes that will help us gain insight into children and caregiver perspectives on adult-child ratio and group size in ECEC. We will present and discuss the generated analytical themes, drawing on examples from the included studies. Tables will be provided that exemplify the flow from descriptive codes to analytical themes in order to enhance analytical transparency.

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Appendices

First and second level screening

First level screening is on the basis of titles and abstracts. Second level is on the basis of full texts. The study will be excluded if one or more of the answers to questions 1-4 are 'No'. If the answers to questions 1 to 4 are 'Yes' or 'Uncertain', then the full text of the study will be retrieved to assess second level eligibility. All unanswered questions need to be posed again on the basis of the full text. If insufficient information is available, or if the study details are unclear, the authors of the study will be contacted if possible.

Screening questions:

1. *Does the study explore adult/child ratio and/or group size in early childhood education or care setting(s)?*

Yes - include

No – stop here and exclude

Uncertain - include

Question 1 guidance:

The population for this review consists of children aged 0-5 years. Studies focusing on adult/child ratio or group size in educational settings with older children will not be eligible.

2. *Is the report/article a qualitative study collecting empirical data?*

Yes - include

No – stop here and exclude

Uncertain – include

Question 2 guidance:

We will include all types of qualitative studies that collect empirical data and provide descriptions of main methodological issues such as sampling, data collection procedures and

type of data analysis. A qualitative study may apply a wealth of data collection methods, with participant observation, in-depth interviews, or focus groups being examples of possible methods we may encounter in the included studies.

If in doubt, include for second level screening on full text.

Critical appraisal checklist

- Date and name of reviewer
 - Date of appraisal
 - Name of reviewer

- Is there congruity between the stated philosophical perspective and the research methodology?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is there congruity between the research methodology and the research question or objectives?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is there congruity between the research methodology and the methods used to collect data?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is there congruity between the research methodology and the representation and analysis of data?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is there congruity between the research methodology and the interpretation of results?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is there a statement locating the researcher culturally or theoretically?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is the influence of the researcher on the research, and vice-versa, addressed?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Are participants, and their voices, adequately represented?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Is the research ethical according to current criteria or recent studies, and is there evidence of ethical approval by an appropriate body?
 - Yes, please specify
 - No, please specify
 - Unclear, please specify
 - Not applicable, please specify

- Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

- Yes, please specify
- No, please specify
- Unclear, please specify
- Not applicable, please specify

- Overall appraisal
 - Include for analysis
 - Exclude from analysis
 - Seek further info