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Composition of staff teams in early childhood education and care centres in nine countries

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The opinions and arguments expressed herein are those of the authors and do not necessarily reflect the official views of the OECD or of its Member countries.

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Abstract

This study draws on data from TALIS Starting Strong 2018, an international survey of early childhood education and care (ECEC) staff and leaders, to examine the staff roles (leader, teacher, assistant, specialised staff, intern, other) that are included in ECEC centres in nine countries: Chile, Denmark, Germany, Iceland, Israel, Japan, Korea, Norway and Türkiye. The staffing profiles in ECEC centres are compared across countries as well as within countries, according to whether the centre was co-located with a primary school, its size in terms of the number of children enrolled, and the concentration of children with special needs and those from socio-economically disadvantaged homes. In addition, associations between the share of teachers and assistants in ECEC centres and staff reports of their time working on tasks without children, their collaboration with colleagues, their work-related stress and job satisfaction were examined. Results are discussed in terms of the different policy contexts in the participating countries and implications for building an ECEC workforce to address demands for both increased access to and better ECEC quality for children.

Keywords: Early childhood education and care, Staff teams, International, Professional well-being, Collaborative practices

Introduction

Around the world, enrolment in early childhood education and care (ECEC) is growing (OECD, 2022; UNESCO, 2022). As ECEC is increasingly recognized as providing important value for children, families and societies, there is strong pressure to continue expanding access to ECEC to more families, leading to the need for more ECEC centres and more ECEC staff to work in these centres. At the same time, there is also a growing focus on quality in ECEC settings and related emphasis on “professionalisation” of the workforce: ECEC staff are paramount for ensuring the quality of ECEC experienced by young children (Manning et al., 2017; OECD, 2018; Peeters, 2008). With the demand for ECEC exceeding supply, the dual demands of recruiting more ECEC staff and strengthening the requirements for their education and training creates several policy challenges that play-out on a daily basis in ECEC centres.

ECEC staff work together in teams to support young children's learning, development and well-being, and the composition of these staff teams is important for several reasons. First, when colleagues are perceived as supportive and teamwork is fostered, ECEC staff have higher levels of well-being and experience less occupational burnout (Madill, Halle, Gebhart, & Shuey, 2018; Schaak et al., 2020). Second, staff well-being is linked with their practices with children (Cassidy et al., 2017; Sandilos et al., 2018). This paper looks at how the composition of ECEC centres' staff teams differs across nine countries, and how the proportion of teachers and assistants within a centre may relate to different aspects of work in ECEC centres (i.e., time spent working without children and collaboration with colleagues) and overall professional well-being (i.e., work stress and job satisfaction).

Staff roles in ECEC centres

ECEC staff have wide-ranging responsibilities in addition to their work directly with children, such as documenting child development, completing administrative tasks and communicating with families. Moreover, time spent directly with children in ECEC centres is also quite multi-faceted, involving (but not limited to) one-on-one time with individual children, scaffolding learning in small and large groups, supporting free-play activities, as well as providing regular breaks for meals or snacks and ensuring adapted hygiene routines (e.g., around diapering/toileting). The staff expected to fill these roles differs across countries, but typically involves multidisciplinary teams with different levels and types of education and training: differentiating between teachers (or core practitioners/lead pedagogues) and assistants is common (OECD, 2001, 2019a). These different professionals may work together in different ways, depending on the extent to which their various job responsibilities are shared or separated based on roles.

International data suggest that ECEC centres tend to be relatively small, particularly in comparison with schools. As such, it is likely that staff have opportunities, or are required, to work in different configurations within a centre at different times. This is also likely to vary across countries: data from nine countries show an average of five staff members working with the same group of pre-primary aged children on the same day in Germany compared to ten staff members in Korea (OECD, 2019a). Given the low average number of children in these groups (17 in Germany and 16 in Korea), these data suggest it is not merely a need to attain reasonable staff-to-child ratios that prompts engagement from so many professionals throughout the day. Rather, it is likely that ECEC staff work together in dynamic ways to meet all of the demands of their jobs. For these reasons, this paper focuses on ECEC centre's staff teams, referring to all staff in an ECEC centre who interact with children in a pedagogical way on a regular basis.

Although ECEC staff are increasingly expected to have professional qualifications, in practice this is often achieved through strengthening educational requirements for those in the role of teacher or lead pedagogue, and reflects the highly fragmented training pathways for ECEC staff (Akaba et al., 2022; Campbell-Barr et al., 2020). This situation accentuates false distinctions between "education" and "care" tasks, with responsibility falling to more highly educated teachers for the former and to less educated assistants for the latter (Peeters et al., 2018). At the same time, historically, equality is valued in ECEC settings, reflecting the importance of including children's voices but also creating

relatively flat hierarchies among staff (Langford, 2010; Steinnes & Haug, 2013; Thomas, 2012). When teams are comprised of staff with different training profiles, professional satisfaction may differ if career benefits are not well-aligned with different levels of expertise and education. International data show that in several countries, staff who are more educated and who have more responsibilities in their ECEC setting (i.e., teachers versus assistants) feel less valued than their colleagues with lower educational attainment and responsibility (OECD, 2020a). ECEC staff may also struggle to find their professional identity amidst the different role divisions, such as in Chile, where those working in the school-based sector do not necessarily feel like they are school-teachers or ECEC educators (Lagos-Serrano, 2022).

As the ECEC sector has expanded to serve more children over recent decades, data from Germany demonstrate that this has also entailed important shifts in the way ECEC settings are organised: larger centres with more staff have become increasingly prevalent, while smaller centres reflect a diminishing share of the sector (Beher et al., 2021). These shifts have required more personnel in leadership roles, with increased demands for administrative tasks. In general, larger centres allocate more staff resources towards leadership and administrative functions compared with smaller centres (OECD, 2020a).

In Norway, teachers have more additional responsibilities related to leadership tasks than assistants, and also for other types of tasks outside of working with children (Steinnes & Haug, 2013). This means assistants spend a larger percentage of their time working directly with children than teachers; however, teachers are equally involved in specific activities with children as are assistants, suggesting a weak division of labour. The nature of work in ECEC centres requires staff to multi-task or shift frequently between different demands. In addition to having a preference for this type of dynamic work, findings from Australia suggest staff are best equipped to cope with the multitude of demands on their time when they have a strong team to support them and engage in tasks together, in ways that align with the demands of the centre overall (Collins et al., 2022; Cumming, et al., 2022). However, a lack of time for professional duties outside of working with children can limit ECEC staff capacity to engage with one another and collaborate as a team (Akaba et al., 2022).

Given the range of training profiles staff have in ECEC settings, collaboration can be a valuable strategy for building on strengths within a team, allocating tasks efficiently and developing additional competencies for individual staff members. Furthermore, collaboration across staff as well as with other professionals (e.g., nurses, librarians) can help ECEC settings provide more tailored services to families as well as adapt to changing societal conditions and unexpected events (e.g., natural disasters, pandemics) (Nilsson Brodén, 2022). At other levels of education, collaboration amongst teachers is a learning activity that is closely connected to everyday situations, as opposed to more general learning that occurs outside the context of the workplace (Kyndt et al., 2016). In addition to supporting individual staff, collaboration is an integral part of a “competent system,” one that works more holistically to provide good quality ECEC and respond to changing global and societal demands (Peeters et al., 2018). However, achieving good collaboration between teachers and assistants in schools is a process that can take time, in particular for teachers given the power differential inherent in different roles, despite egalitarian traditions in the sector (Jardía et al., 2022; Nilsson Brodén, 2022).

Staff well-being

Positive interactions with other staff are important to bolster the professional well-being of ECEC staff and for teachers more generally (Masdeu Navarro, 2015; OECD, 2020a). A national study in the U.S. found that teachers who perceived that teamwork was encouraged in their ECEC centres reported lower levels of psychological distress (Madill et al., 2018). Similarly, social support at work is considered a key resource for promoting teachers' well-being and job satisfaction, and reducing the likelihood of burnout (Viac & Fraser, 2020). Thus, working in teams has the potential to be an important, positive resource for meeting all of the demands ECEC staff face in their work; however, other findings suggest that collaboration may not be sufficiently developed to buffer against the various stressors experienced by ECEC staff (OECD, 2020a).

Furthermore, despite the potential for working in a team to have benefits for well-being, this depends on the team members and the way work is shared across them. ECEC teachers, those with higher levels of education, are often expected to share expertise through supporting the work of other ECEC staff members (Thomas, 2012). Although this can be an enriching part of working together with a team, allowing opportunities for professional growth through sharing of knowledge, it can also be a source of stress due to the responsibility placed on these teachers. Across countries, staff who have not completed a preservice education or training programme focused on working with children are more typically working as assistants than as teachers, and they also tend to have less experience in the ECEC sector (OECD, 2020a). To the extent that teachers are responsible for training their colleagues who are less well-prepared for work in ECEC settings, it may mean that working in teams can be more of a job demand than a resource (Appl, 2006; Bullough Jr., 2015).

Furthermore, with relatively small differences in pay for different staff roles, the pressures on some teachers may create a mismatch between their job demands and rewards. Moreover, in several countries, data suggest that work done outside of time with children, and not linked to the preparation of work with children, increases overall work time and becomes a source of stress (OECD, 2020a). In particular, teachers (compared to assistants), as well as staff with more years of experience and those working more hours, report higher levels of work-related stress specifically around administrative tasks and documenting children's development.

Current study

This study aims to inform both research and policy on ECEC team concepts across countries by addressing three key questions:

1. What staff roles are included in ECEC teams across countries?
2. How does the composition of ECEC staff teams vary with centres' characteristics?
3. How does the composition of staff teams in ECEC centres relate to staff time spent on tasks without children, their collaboration with colleagues, their work-related stress and job satisfaction?

As governments grapple with shortages of ECEC staff, as well as demands to continue expanding the ECEC workforce, having teams of professionals with varied training backgrounds and mixed skill sets will likely continue to be the most practical strategy in most contexts. Although there can be challenges related to this diversity of ECEC professionals, it can also be an important source of strength for addressing the multiple needs of young children and their families. Yet, relatively little is known about how ECEC staff with different backgrounds work together in teams, and how the composition of these teams may vary within or across countries. This study examines data from pedagogical staff and ECEC centre leaders in nine countries to expand the research-base on this important topic.

Methods

Data were drawn from the OECD Starting Strong Teaching and Learning International Survey (TALIS Starting Strong). TALIS Starting Strong is the first international survey of the ECEC workforce (OECD, 2019a). Data were collected in 2018 in nine countries: Chile, Denmark, Germany, Iceland, Israel, Japan, Korea, Norway and Türkiye. Additional file 1 provides a summary of the ECEC systems in each of these countries. All countries collected data from pedagogical staff and leaders in pre-primary education (ISCED level 02). The International Standard Classification of Education (ISCED) is an instrument for compiling statistics on education internationally. In addition, four of the nine countries (Denmark, Germany, Israel and Norway) collected data from pedagogical staff and leaders in settings serving children under age 3.

TALIS Starting Strong used a two-stage probability sample, designed to achieve a nationally representative sample of staff in each country. At the first sampling stage, ECEC settings were selected, and at the second stage, staff were randomly sampled within these settings (or all staff were selected for participation in the case of small ECEC settings). Staff were considered in-scope for inclusion in the survey if they were “as part of their regular duties...providing learning opportunities for children” in the relevant ECEC age bracket (i.e., either pre-primary age or for children under age 3 or both) (OECD, 2019b, p. 94). The leader of each setting (i.e., the person with the most responsibility for administrative, managerial and/or pedagogical leadership) was automatically selected for participation (OECD, 2019b). This paper uses data from centre-based settings in all countries and at both levels of ECEC (pre-primary and settings for children under age 3). Although data were collected in home-based settings for children under age 3 in Denmark, Germany and Israel, given the very small nature of these settings (typically a single staff person working with a small group of children), these data were excluded from the present analysis.

Details on the final analytic sample are included in Table 1. Sufficient data are available from all countries for the analysis reported in this paper; however, low response rates in Denmark mean the data should not be assumed to be nationally representative. Similarly, moderate response rates in Germany mean that estimates for sub-groups and estimated differences between sub-groups need to be interpreted with care. Additional information on characteristics of the sample in each participating country are available in previously published substantive and technical reports (OECD, 2019a, 2019b).

Table 1 Sample size and average size of ECEC settings across countries

	Leader N (National response rate)	Staff N (National response rate)	Average number of staff in centres (SE)	Average number of children in centres (SE)
Pre-primary education				
Chile	228 (98.6%)	1349 (97.1%)	17.9 (0.8)	59.0 (3.6)
Denmark	102 (55.3%)	544 (38.5%)	17.9 (0.5)	74.5 (2.5)
Germany	247 (69.0%)	1401 (51.1%)	13.4 (0.5)	67.4 (2.8)
Iceland	178 (75.4%)	1378 (73.8%)	26.6 (0.5)	81.2 (1.1)
Israel	416 (98.3%)	1042 (94.1%)	6.0 (0.1)	30.1 (0.2)
Japan	216 (98.6%)	1616 (98.2%)	18.8 (1.1)	116.3 (4.4)
Korea	188 (76.1%)	927 (72.9%)	11.9 (0.4)	53.0 (1.5)
Norway	152 (83.8%)	815 (65.9%)	18.2 (0.6)	46.8 (1.9)
Türkiye	340 (99.8%)	1605 (99.2%)	10.1 (0.6)	72.1 (5.3)
Centres for children under age 3				
Denmark	55 (47.5%)	329 (37.6%)	20.1 (1.1)	75.4 (4.8)
Germany	223 (57.2%)	1121 (51.1%)	13.9 (0.5)	67.3 (2.2)
Israel	155 (97.4%)	1042 (92.8%)	13.5 (0.9)	59.5 (1.6)
Norway	163 (92.6%)	938 (78.8%)	17.9 (0.7)	47.2 (2.3)

Response rates are calculated based on the complete national samples and included home-based settings for children under age 3 in Denmark, Germany and Israel, which are not included in analyses presented in this paper. Response rates for staff account for the two-stage sampling design

Measures

This section describes the data used to address the current research questions, as well as how these data were coded (in parentheses) for analyses presented in this paper. Questions 1 and 2 are addressed using data from ECEC centre leaders. Leaders provided information about their centres, including its geographic (0 = municipality with up to 15,000 people; 1 = municipality with more than 15,000 people) and physical location (0 = not co-located with a primary school; 1 = co-located with a primary school) and type of management (0 = private; 1 = public). Leaders also reported on the size of their centres in terms of the number of children, as well as characteristics of the children enrolled. To create an internationally comparable indicator of the size of centres, each national sample was divided into four equal quarters, with increasing numbers of children per centre. The first quarter is used as the reference in regression analyses, meaning the number of children in the centre is among the 25% lowest of the country's distribution. Two characteristics of children in centres are included in the current paper: concentration of children from socio-economically disadvantaged homes and concentration of children with special needs. In both cases, centres with 11% or more of the children with the respective characteristics are compared to centres where the proportion is 10% or less (the referent group).

Finally, leaders reported on the number and type of staff employed in their centres, using seven categories of staff roles: leaders, teachers, assistants, staff for individual children, staff for special tasks, interns and other. Staff whose "professional activity involves the transmission of knowledge, attitudes and skills to children" were to be included in these reports; thus, the questionnaire was not intended to capture the presence of administrative staff or other non-pedagogical personnel (e.g., cleaners, cooking staff). Given the variation in the number of pedagogical staff in centres related to numerous

contextual factors, notably the number of children in the centre, to facilitate comparisons across centres within and across countries, data on different staff roles are presented as a percentage of the total number of staff in the centre, as indicated by the leader across the seven categories. These centre-level data are used to define the centre's team composition: the team is considered all pedagogical staff and leaders working together in the ECEC centre.

Question 3 draws on data from ECEC staff themselves. Staff respondents provided rich information on their education (three categories: secondary education or less, post-secondary non-tertiary education or short-cycle tertiary education, and a bachelor's degree or higher as the omitted referent) and training backgrounds (0=no training specifically to work with children; 1=training specifically to work with children), their years of experience working in ECEC (three categories: less than 5 years, between 5 and 9 years, and more than 9 years as the omitted referent), whether they were employed on a permanent contract (0=no; 1=yes) and on a full-time basis (0=no; 1=yes), and whether their role with a specific group of children was as a teacher or leader versus as an assistant or another staff role (the referent group). These background characteristics are used as control variables in regression analyses.

Four constructs are the outcomes of interest for the regression analyses to address Question 3: percent of time staff work without children; collaboration with colleagues at the ECEC centre; work-related stress; job satisfaction. Staff reported on their time spent on various work tasks, including working hours spent with children and total working hours. Staff's hours working without children were divided by their total working hours to obtain a proportion of working time without children for each respondent. This time can include preparation for or reflection on work with children, as well as more varied administrative and other tasks. Staff also reported on their collaboration with colleagues at the ECEC centre, their work-related stress, and job satisfaction. Each of these constructs was captured using multiple items that were subsequently scaled to be internationally comparable (see OECD, 2019b for details).

The staff-level data are used to complement leader data, giving a broad perspective on team concepts across countries as well as a detailed examination of individual staff experiences and in different contexts. Two leader-reported variables were of primary interest for understanding staff outcomes: the percentage of teachers in the centre and the percentage of assistants in the centre. These two variables were standardized to have a mean of zero and a standard deviation of one to facilitate interpretation of the resulting regression coefficients in standard deviation units. Each of these variables was included in the regression analysis, with all other categories of staff (i.e., leaders, staff for individual children, staff for special tasks, interns and other, as applicable in each country) omitted. Thus, the results for the percentage of teachers in the centre is relative to the presence of all these more specialised types of staff, while holding constant the percentage of assistants in the centre, and vice versa. The percentage of teachers and the percentage of assistants were chosen as focal variables to allow comparability across all countries included in the data set, as well as to give insight on how these main categories of pedagogical staff in ECEC centres shape the professional experiences of individual ECEC staff members.

Table 2 Share of different staff categories in ECEC centres, according to leaders

	Leaders [Respondents with additional staff duties]	Teachers	Assistants	Specialised staff	Interns	Other
	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)
Pre-primary education						
Chile	19.27 (0.87) [19.84 (2.36)]	18.91 (0.70)	30.94 (0.91)	22.04 (0.82)	4.19 (0.63)	4.64 (0.58)
Denmark	8.76 (0.47) [48.19 (4.37)]	46.08 (1.13)	29.77 (0.88)	6.84 (0.70)	5.36 (0.56)	3.20 (0.83)
Germany	9.42 (0.33) [45.99 (2.95)]	32.61 (1.04)	34.36 (0.96)	8.98 (0.62)	10.79 (0.53)	3.85 (0.51)
Iceland	5.13 (0.13) [22.00 (3.12)]	53.31 (1.53)	19.80 (1.60)	10.72 (0.55)	–	11.04 (1.02)
Israel	– [100.00 (0.00)]	35.23 (0.50)	45.75 (0.67)	10.99 (0.58)	4.24 (0.49)	3.78 (0.44)
Japan	8.84 (1.17) [0.00 (0.00)]	72.93 (1.60)	18.22 (1.72)	–	–	–
Korea	11.80 (0.82) [6.25 (2.02)]	57.81 (1.31)	11.45 (1.35)	12.38 (1.18)	0.33 (0.13)	6.22 (0.72)
Norway	8.03 (0.33) [14.56 (2.55)]	31.49 (0.66)	44.70 (0.95)	5.34 (0.51)	4.28 (0.81)	6.15 (0.58)
Türkiye	26.73 (1.09) [0.00 (0.00)]	48.86 (1.49)	1.43 (0.24)	8.51 (0.71)	10.77 (0.95)	3.70 (0.87)
Centres for children under age 3						
Denmark	8.60 (0.49) [36.84 (5.64)]	46.41 (1.95)	31.32 (1.94)	4.13 (0.97)	5.04 (0.65)	4.50 (1.24)
Germany	10.10 (0.59) [50.20 (3.36)]	32.64 (1.12)	33.15 (1.18)	7.68 (0.62)	11.22 (0.58)	5.22 (0.79)
Israel	17.14 (2.76) [0.57 (0.57)]	70.27 (3.35)	2.63 (0.62)	2.43 (0.79)	0.88 (0.31)	6.66 (1.97)
Norway	8.27 (0.80) [13.13 (3.04)]	32.19 (0.85)	44.52 (0.80)	6.12 (0.65)	3.38 (0.45)	5.52 (0.68)

Data on leader respondents with additional staff duties were collected as part of the sampling frame and not directly reported by the leaders themselves

Analytic strategy

Data were analysed in Stata using the Repest command suite to account for the sampling design and weights. For Questions 1 and 2, centre weights were used, and for Question 3 staff weights were used. Regression analyses were conducted for Question 3, controlling for both individual staff characteristics as well as leader-reported centre characteristics.

Results

Staff roles included in ECEC teams across countries (question 1)

Across the nine countries, the composition of ECEC centres' staff teams reported by leaders demonstrates different approaches to providing ECEC (Table 2). In the pre-primary sector in Israel, one teacher is also the setting leader and thus were reported exclusively in the teacher category. Leaders were reported separately in all other countries, although the prevalence of leaders with staff duties (i.e., working directly with children on a regular basis) varied: in settings for children under age 3 in Germany, about half of leaders are also responsible for pedagogical work directly with children, whereas in Japan and Türkiye no leaders reported having this type of mixed role.

In all countries, leaders reported that there were both teachers and assistants in their centres; however, this role distinction is not officially recognised in the policies of Japan, Türkiye and centres for children under age 3 in Israel, and does not necessarily reflect whether staff are officially certified teachers (OECD, 2019a). Interns are included in ECEC staff teams in all countries except in Iceland and Japan, although their presence is quite limited in some countries (in Korea and centres for children under age 3 in Israel) and more widespread in other countries (in Türkiye and in both levels of ECEC in Germany). Specialised staff, who may support education and care for individual children or offer specialised activities for all children (e.g., music or sports), are identified by leaders in all countries with the exception of Japan. In general, specialised staff make up a relatively small proportion of the centre human resources reported by ECEC leaders, although there are notable variations across countries. For example, on average in Chile, leaders report that specialised staff account for nearly a quarter of the workforce in their centres.

The composition of ECEC staff teams and centre characteristics (question 2)

In pre-primary centres in Germany, the percentage of teachers is higher in large centres compared to small ones, and this is offset by having a smaller share of specialised staff in large centres compared to small ones (Table 3). In Denmark in centres for children under age 3, large centres have a greater share of assistants in their teams, which is balanced by a smaller share of specialised staff, compared to small centres. In Chile, Korea and Türkiye the percentage of specialised staff is higher in large centres compared to small ones (with no significant trade-off in terms of the percentage of teachers or assistants), suggesting that in these countries, larger centres may have greater capacity for staff to take more specialised roles. Similarly, in centres for children under age 3 in Germany, Israel and Norway, the percentage of teachers is higher in large centres compared to small ones, with no corresponding reductions in the percentages of assistants or specialised staff. In these centres for very young children, the larger size may support having more staff with higher qualifications, or who are focused on leading pedagogical work.

For ECEC centres co-located with primary schools, the percentage of teachers on the team is higher in centres for children under age 3 in Israel and in pre-primary centres in Türkiye, compared to centres that are not co-located with primary schools. In turn, in centres for children under age 3 in Israel, the percentage of assistants on the team in centres co-located with primary schools is smaller, and in Türkiye, the percentage of both assistants and specialised staff on the team is smaller. In pre-primary centres in Chile and Israel, the percentage of assistants is lower in centres that are co-located with primary schools, but the share of specialised staff is higher in these centres.

Consistent with the potential of their roles in supporting children with special needs, in centres with more children with special needs, the percentage of specialised staff is greater in pre-primary centres in Chile, Denmark, Germany and Israel, and in centres for children under age 3 in Germany and Norway. In Chile, these centres with more children with special needs in turn have smaller shares of both teachers and assistants on their teams. In pre-primary centres in Germany and Israel, the greater share of specialised staff on teams in centres with more children with special needs is offset by having fewer

Table 3 Differences in the percentage of teachers, assistants and specialised staff in ECEC centres, by centre characteristics, according to leaders

	Centre size: top quarter-bottom quarter ¹			Concentration of children with special needs: high-low ²			Centre co-located with school-Centre not co-located with school ³			Concentration of children from socio-economically disadvantaged homes: high-low ⁴		
	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)
Pre-primary education												
Chile	3.01 (2.14)	-6.43 (3.47)	5.96* (2.97)	-6.59*** (1.22)	-21.53*** (2.55)	22.78*** (2.53)	-2.67 (1.38)	-22.86*** (1.66)	19.15*** (2.25)	-6.22*** (1.51)	-11.72*** (2.89)	13.88*** (2.33)
Denmark	1.87 (2.92)	9.87** (3.14)	-2.74 (1.95)	-3.75 (2.58)	3.98 (2.65)	4.91*** (1.36)	-7.45 (2.85)	4.89 (3.38)	-1.06 (2.38)	-1.69 (2.89)	2.46 (2.81)	3.93** (1.48)
Germany	14.62*** (3.18)	-1.82 (3.66)	-4.52 (1.77)	1.11 (4.59)	-9.24* (4.22)	6.75* (3.37)	4.03** (4.11)	-7.44 (6.26)	-5.20*** (1.43)	4.13 (2.46)	-4.02 (2.27)	2.70 (1.50)
Iceland	-1.92 (4.31)	4.49 (4.59)	0.86 (1.92)	-6.82 (3.52)	3.87 (4.18)	0.28 (1.28)	-2.52 (3.53)	-1.15 (3.68)	-0.06 (1.59)	3.42 (5.90)	-5.00 (6.87)	-0.74 (3.00)
Israel	-3.15* (1.56)	3.36 (1.76)	2.38 (1.65)	-1.92 (1.52)	-4.62* (2.27)	3.99* (2.03)	-0.01 (1.74)	-7.11** (2.39)	6.43** (2.24)	0.89 (1.45)	-4.39* (2.05)	1.32 (1.38)
Japan	4.38 (4.88)	5.89 (4.45)	- (4.45)	-12.54* (5.33)	10.43* (4.77)	- (4.77)	-18.88 (10.98)	9.87 (8.54)	- (4.70)	-4.68 (7.54)	9.24 (7.75)	- (6.53)
Korea	0.82 (3.26)	2.97 (4.31)	9.28* (4.55)	6.22 (4.96)	-3.69 (2.17)	2.23 (3.84)	-12.42** (4.54)	5.25 (4.70)	-2.10 (3.63)	-7.67 (6.97)	2.32 (7.29)	-2.63 (6.53)
Norway	1.01 (1.95)	4.81 (3.07)	0.93 (1.41)	-4.72 (4.20)	-0.03 (4.11)	0.81 (2.38)	3.88 (3.37)	-4.08 (3.08)	-3.9*** (0.98)	1.63 (2.56)	-4.20 (2.62)	2.08 (2.75)
Türkiye	4.64 (5.18)	0.31 (0.61)	6.87*** (2.08)	18.96** (5.99)	-0.17 (1.55)	-3.33 (2.80)	8.12** (2.64)	-3.04*** (0.68)	-5.73*** (1.56)	2.73 (3.86)	-0.81 (0.42)	-0.77 (2.10)
Centres for children under age 3												
Denmark	3.26 (6.50)	10.09* (4.46)	-4.98* (2.00)	9.37** (2.90)	-6.25* (3.15)	-0.60 (2.35)	-5.47 (5.99)	-8.78** (3.04)	-4.16*** (0.92)	-1.80 (7.63)	-6.66* (2.98)	3.81 (2.79)

Table 3 (continued)

	Centre size: top quarter–bottom quarter ¹			Concentration of children with special needs: high–low ²			Centre co-located with school–Centre not co-located with school ³			Concentration of children from socio-economically disadvantaged homes: high–low ⁴		
	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)	Teachers <i>M</i> (SE)	Assistants <i>M</i> (SE)	Specialised staff <i>M</i> (SE)
	Germany	14.23 (3.73)	-7.71*** (4.28)	0.65 (1.80)	-4.20 (3.84)	-7.11 (3.80)	10.95*** (2.34)	2.96 (2.18)	-0.94 (1.51)	-2.15 (4.85)	6.86 (4.02)	-6.12 (3.80)
Israel	26.59* (11.45)	3.07 (1.79)	-1.21 (1.58)	3.61 (8.92)	11.50 (7.90)	-2.49** (0.86)	11.55** (3.89)	-2.09* (0.88)	-1.59 (1.46)	9.56 (6.35)	2.47 (1.54)	4.32 (4.22)
Norway	6.46** (2.01)	-0.78 (2.16)	2.47 (1.89)	-5.79 (3.92)	-2.34 (3.48)	8.39** (3.16)	-6.31 (4.25)	2.44 (3.06)	-5.01*** (1.36)	4.69 (2.39)	-1.41 (2.00)	3.13 (1.81)

Significant results are in bold

¹ Quarters refer to 25% of ECEC centres inside a country. The lowest quarter refers to the 25% of ECEC centres for which the statistics obtained are the lowest (i.e., the 25% of centres within a country that register the lowest number of children), while the top quarter refers to the 25% of centres for which the statistics are the highest (i.e., the 25% of centres within a country that register the highest number of children)

² “Children with special needs” are those for whom a special learning need has been formally identified, because they are mentally, physically, or emotionally disadvantaged. A “high” share is considered to be 11% or more, a “low” share less than or equal to 10%

³ “Co-located with school” refers to centres that share their location with a primary school

⁴ “Socio-economically disadvantaged homes” refers to homes lacking the basic necessities or advantages of life, such as adequate housing, nutrition or medical care. A “high” share is considered to be 11% or more, a “low” share less than or equal to 10%

* $p < .05$; ** $p < .01$; *** $p < .001$

assistants in these centres. In Japan, leaders report fewer teachers and more assistants in centres with more children with special needs. In contrast, in centres for children under age 3 in Denmark, there is a greater share of teachers and a smaller share of assistants on staff teams in centres with more children with special needs. The prevalence of centres with more children with special needs varies by country as well, which could reflect differences in the countries' inclusion policies regarding children with special needs, or in the number and level of training of professionals available to diagnose specific needs and integrate children with identified special needs in ECEC (OECD, 2019a).

The composition of staff teams in ECEC centres was associated with the concentration of children from socio-economically disadvantaged families in these centres in only a few countries. In pre-primary centres in Chile and Denmark, and in centres for children under age 3 in Germany, specialised staff make up a larger proportion of staff teams in centres with a greater concentration of children from socio-economically disadvantaged homes. In Chile, staff teams have a smaller proportion of both teachers and assistants in centres with a greater concentration of children from socio-economically disadvantaged homes.

Time spent on tasks without children, collaboration, work-related stress and job satisfaction (question 3)

Regression analysis results revealed that the composition of staff teams in ECEC centres was associated with staff outcomes in different ways across the nine participating countries, although null associations were most common; the few statistically significant associations suggest mainly weak links amongst the variables of interest (Table 4). With regard to staff time spent on tasks without children, in pre-primary centres in Denmark, having a team with a higher percentage of teachers in the ECEC centre, compared to other, more specialised types of staff, was associated with staff spending a greater percentage of their work time on tasks without children. In contrast, in Türkiye, having a greater share of both teachers and assistants in the ECEC centre was associated with staff spending a lower percentage of their work time on tasks without children; however, this latter finding should be interpreted with caution as leaders reported very few assistants in ECEC centres in Türkiye. Having a greater share of teachers in the ECEC centre in Türkiye was also associated with staff reporting greater collaboration with colleagues, but the opposite was true in centres for children under age 3 in Norway, where staff reported less collaborative practices when the percentage of teachers was higher compared to other, more specialised types of staff.

Staff reports of their work-related stress were associated with the centre's staff composition in several countries. In pre-primary centres in Chile and Israel, having a greater percentage of the staff team comprised of teachers was associated with less work-related stress for staff. Looking at the percentage of the staff team comprised of assistants, having a greater share assistants was associated with more work-related stress for staff in pre-primary centres in Iceland and Norway, and in centres for children under age 3 in Denmark. In pre-primary centres in Iceland, having a greater percentage of the staff team comprised of assistants was also associated with lower reports of job satisfaction among staff. The composition of the centre's staff team was not associated with staff's job satisfaction in any other countries.

Table 4 Regression coefficients and standard errors for centre-level staff composition associated with individual staff time working without children, collaboration and well-being

	Percent of time working without children						Collaboration			Work-related stress			Job satisfaction			
	% staff who are teachers in the centre		% staff who are assistants in the centre		% staff who are teachers in the centre		% staff who are assistants in the centre		% staff who are teachers in the centre		% staff who are assistants in the centre		% staff who are teachers in the centre		% staff who are assistants in the centre	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
<i>Pre-primary education</i>																
Chile	-0.01	0.01	-0.01	0.01	0.00	0.09	0.07	0.10	-0.23***	0.06	0.05	0.09	0.04	0.07	-0.09	0.10
Denmark	0.02*	0.01	0.02	0.01	0.00	0.09	-0.02	0.11	-0.29	0.19	0.14	0.14	0.18	0.13	-0.12	0.15
Germany	-0.02	0.01	0.00	0.01	0.19	0.10	0.16	0.09	-0.09	0.07	-0.04	0.07	0.21	0.13	0.06	0.13
Iceland	-0.01	0.01	-0.01	0.01	0.04	0.09	-0.08	0.09	0.10	0.08	0.23**	0.07	0.04	0.10	-0.25*	0.10
Israel	0.01	0.01	0.01	0.01	-0.09	0.13	-0.05	0.09	-0.31*	0.14	-0.15	0.10	-0.02	0.07	0.06	0.06
Japan	0.01	0.01	0.02	0.01	-0.10	0.12	-0.18	0.10	-0.26	0.19	-0.09	0.18	0.19	0.20	-0.02	0.17
Korea	-0.02	0.01	-0.02	0.01	-0.06	0.10	0.01	0.09	-0.03	0.09	0.07	0.10	-0.04	0.12	-0.10	0.15
Norway	-0.01	0.01	-0.01	0.01	-0.08	0.08	-0.07	0.08	0.16	0.09	0.21*	0.10	-0.05	0.12	-0.12	0.13
Türkiye	-0.03**	0.01	-0.03**	0.01	0.24*	0.12	0.16	0.11	-0.02	0.14	0.00	0.10	0.17	0.13	0.05	0.11
<i>Centres for children under age 3</i>																
Denmark	0.01	0.02	-0.01	0.02	0.12	0.12	-0.09	0.13	0.11	0.13	0.42***	0.12	-0.10	0.30	-0.16	0.30
Germany	0.00	0.01	0.01	0.01	-0.18	0.10	-0.10	0.09	0.06	0.09	0.08	0.09	0.01	0.13	-0.10	0.12
Israel	-0.01	0.01	-0.01	0.01	-0.07	0.21	-0.11	0.15	0.06	0.16	-0.01	0.18	-0.21	0.14	-0.13	0.10
Norway	-0.01	0.02	0.00	0.01	-0.17*	0.07	-0.02	0.06	0.05	0.09	-0.07	0.11	-0.16	0.10	0.04	0.11

Regressions controlled for staff education and training background, years of experience, permanent and full-time contract status, and role with a specific group of children, as well as centre characteristics, including geographic and physical location, type of management, size, concentration of children with special needs and concentration of children from socio-economically disadvantaged homes. Complete regression results available upon request

* $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

The research questions addressed in this paper are critical to inform policy: countries are confronting shortages of ECEC staff and considering strategies to attract more people into the profession. The best strategies for increasing the size of the ECEC workforce are not evident, however, given the wide-ranging job responsibilities and scope of relevant training for ECEC staff. With the diverse education and training profiles of existing ECEC staff and multiple pathways to enter the profession, teams of professionals with different knowledge and experiences are likely to remain the dominant model in most countries. The results presented in this paper extend previous international reporting (OECD, 2019a; OECD, 2020a) to identify different patterns of pedagogical staffing within ECEC centres both across and within countries, and link these staffing profiles with several aspects of staff's daily work and professional well-being.

Findings highlight the role of specialised staff (i.e., staff for special activities, such as music or sports, and those who work with specific children) in supporting ECEC teams. Notably, in centres with more children with identified special needs, the percentage of specialised staff is greater in ECEC centres in several countries. However, this implies a staffing trade-off, and typically means fewer assistants working in these centres. This rebalancing of staff roles in certain centres may be an important strategy for improving quality for children. At the same time, attention is needed to ensure staff teams are balanced in ways that promotes staff well-being: having a greater share of teachers or a smaller share of assistants was associated with lower work-related stress among ECEC staff in several countries.

The context within countries is important for understanding the findings reported here. For instance, in Iceland, a shortage of qualified ECEC teachers means that staff may need to take on additional roles in their centres, or different roles than what would be expected based on their education and training (OECD, 2019a). In this context, where staff would expect the system to have more qualified teachers, it is not surprising that we find reports of work-related stress are higher and job satisfaction lower when staff teams include a larger share of assistants. This pattern of work-related stress being associated with fewer teachers and more assistants is common across several countries, suggesting policies could better align the composition of staff teams with expectations for training and work responsibilities across staff roles.

Our findings around staff collaboration highlight how work experiences can differ based on the national profiles of ECEC staff teams: in Türkiye, where teachers and leaders are the most common roles in ECEC settings, having a greater share of teachers in the centre was linked with more collaborative practices. In this context, it may be that having more staff with the same role supports opportunities for collaboration. However, in centres for children under age 3 in Norway, teachers and assistants are the most common roles. In this context, staff reported less collaboration when centres had a greater share of teachers, perhaps because collaboration is more typical between teachers and assistants in these settings and less supported among teachers.

Together, the findings presented here speak to the need for a deeper understanding of how policies regulating the composition of staff teams, such as minimum qualifications for different staff roles and required ratios of staff with different qualifications, play-out within ECEC centres. The structures and expectations put in place through these types of policies have direct ramifications for how ECEC staff share job responsibilities and collaborate, and for their professional well-being. In turn, improving these conditions can position ECEC centres to provide appealing, long-term career opportunities and growth, as well as ultimately support the quality of ECEC children experience.

Limitations

One of the strengths of this paper is the internationally comparative data, provided directly by ECEC staff and leaders. However, this design creates several limitations as well. First, the international categories of staff that were applied in all countries were designed to make the resulting data comparable, but some categories are less relevant in some countries and forcing respondents into these predefined categories can also mask important variation (or similarities) across roles within a country. For instance, in Japan, the role of assistant is not formally recognised, and staff do not have different training profiles related to the work they undertake in an ECEC centre; rather, staff's work may vary related to whether they work in kindergartens, day care centres, or integrated ECEC centres (see Additional file 1). Furthermore, the category of specialised staff is quite broad and can encompass different personnel in different countries, but also in different centres within a single country, based on the needs and goals of that setting. Analysis at the international level can obscure some of these nuances within countries, limiting the depth of information available.

In addition, the study did not collect information on the presence of non-pedagogical staff, such as administrative support personnel, cooks or cleaning staff. The presence of these different roles is likely important for the scope of work pedagogical staff must undertake, and, therefore, meaningful for their time usage and overall professional well-being, but this assumption cannot be tested with these data. Data from this study are also self-reported by staff and leaders. While this is an important source of information for understanding their perspectives, administrative data are not available to look beyond perceived staffing structures. Furthermore, the data are correlational and it is not possible to determine causality in any of the associations examined in this paper. The data also represent a single point in time and, therefore, cannot speak to how staff and leader reports may relate to changes in staffing structures, working conditions or professional well-being. Along these lines, the data were collected in 2018 and do not reflect changes in ECEC policies and structures that occurred during or following the COVID-19 pandemic.

Conclusions

As policymakers around the world give greater attention to quality in ECEC, the training profiles and working conditions of ECEC staff are also increasingly of interest (OECD, 2021a). This paper makes an important contribution to understanding similarities and differences in the composition of staff teams across countries, as well as

how these staffing profiles are associated with staff's work on tasks without children, their collaboration with colleagues, work-related stress and job satisfaction. ECEC staff have varied qualifications and training; as this field grapples with what it means to be an ECEC professional, and in a world where professions in general are becoming increasingly inter-related (Noordegraaf, 2020), it will be important for the sector to be intentional about cultivating good working practices within staff teams in ECEC centres.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40723-023-00121-8>.

Additional file 1: Table 1. Early childhood education and care systems in participating countries.

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Author contributions

ES led the analysis and drafting for the manuscript with critical insights and inputs from SJ throughout the process. Both authors read and approved the final manuscript.

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Availability of data and materials

A version of the TALIS Starting Strong 2018 data set is publicly available at <https://www.oecd.org/education/school/oecdalisstartingstrongdata.htm>. Additional components of the data set are not publicly available to protect the confidentiality of all respondents, but are summarized in publications from the OECD: OECD. (2019a). *Providing Quality Early Childhood Education and Care: Results from the Starting Strong Survey 2018*, TALIS, OECD Publishing, Paris. doi:<https://dx.doi.org/10.1787/301005d1-en>. OECD. (2020). *Building a High-Quality Early Childhood Education and Care Workforce: Further Results from the Starting Strong Survey 2018*, TALIS, OECD Publishing, Paris. doi:<https://dx.doi.org/10.1787/b90bb3d-en>

Declarations

Competing interests

The authors declare that they have no competing interests.

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