

Exploring the Impacts of Staff-Child Ratio on Quality of Early Childhood Care and Education – A Comparative Case Study in Hong Kong

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Abstract

This study was to examine the impacts of staff-child ratio on the quality of care and education for toddler-age children through controlling the variables of demographic features and structural characteristics of the compared classrooms. Two toddler classrooms in Hong Kong adopting different staff-child ratios were selected for the comprehensive quality assessments by using the Infant/Toddler Environment Rating Scale - Revised (ITERS-R) approach. The findings indicated a negative association between the staff-child ratio and the global quality of centre-based care and education for toddlers. The quality related to the “Interaction” and “Personal Care Routines” was found to be significantly related to the ratio, while the quality associated with the “Space and Furnishings” and “Program Structure” was less affected. The results of the study demonstrate the applicability of the ITERS-R in a new cultural and linguistic environment, and provide information on how staff-child ratio affects various aspects of the quality of care and education for toddlers.

Keywords: ITERS-R; centre-based; global quality; childcare; staff-child ratio

1. Introduction

The provision of high-quality centre-based childcare and education is an important form of family support, enabling parents to work full-time. It is equally crucial to the development of children, as it builds the foundations for their future. A good start in the early years is known to have a positive effect on children’s development, preparing them for formal schooling and later life (Lally, 2010; Vandell, Belsky, Burchinal, Steinberg, & Vandergrift, 2010). Both society and the economy thus benefit from the provision of high-quality care and education for children.

The adequacy of staff-child ratio in childcare centres has long been an issue for childcare practitioners. The aim of this study is to examine the impacts of staff-child ratio on the quality of care and education for toddler-age children by controlling the variables of demographic profiles and other structural characteristics of the compared classrooms that may affect the care and educational quality. The study used the Infant/Toddler Environment Rating Scale – Revised (ITERS-R) instrument for the comprehensive quality assessments of two purposively selected toddler classrooms. The present study is the first of its kind to examine the effects of staff-child ratio on the quality of care and education for children in the Greater China Region using the ITERS-R methodology.

This paper is divided into four sections. First, we provide an overview of the study’s theoretical frameworks on the selection of childcare centres and the use of the ITERS-R scale to rate the quality of care and education for toddler-age children. Second, we outline the research methods used. Third, we present the psychometric characteristics of the ITERS-R used to measure the quality of the selected toddler classrooms, followed by a statistical analysis of the quality scores obtained. Finally, the effects of staff-child ratio on the quality of care and education for toddlers, and the implications of the study for policy making are discussed.

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2. Theoretical Frameworks

Many studies have demonstrated that the first three years of life are critical for children's development, and that experiencing mistreatment and negative care giving over these years can result in long-term detrimental effects on their cognitive, language, social-emotional, and even physical development (Forry et al., 2013; Sonuga-Barke et al., 2017). Thomason and La Paro (2009) stated that the toddler stage was a unique developmental period of early childhood, during which children develop autonomy, self-adaptation, and language skills through interactions with intimate adults. Toddlers who receive higher quality of care and education are more likely to have better educational and social outcomes than those who receive lower quality of care and education (Lally, 2010). These effects have been shown to last through adolescence, highlighting the importance of these early experiences for children's development (Vandell et al., 2010).

Given the significance of the quality of care and education on young children's development, it is essential to establish a favourable policy environment that can provide quality care and education for toddlers. S. L. Ramey and Ramey (2006) support this view, indicating that the quality of childcare and education must be embedded within the effectual policy context of the structural characteristics of the childcare and education environment. De Schipper, Riksen-Walraven, and Geurts (2006) identified four structural characteristics of child care and education that could affect the quality of service: (1) the staff-child ratio, defined as the number of children taken care of by one staff member; (2) group size; (3) the education and training of childcare teachers; and (4) the salary of childcare teachers. The staff-child ratio is generally considered to be the most influential structural characteristic of centre-based care and education for younger children (National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2000).

Most research has found that a higher quality of childcare and education is provided in classrooms with low staff-child ratios (Banghart & Kreader, 2012; Barros & Aguiar, 2010; De Schipper et al., 2006; Zomeret et al., 2013). However, some studies have found the opposite. For example, Smith, McMillan, Kennedy, and Ratcliffe (1989) found no significant difference in the quality of staff-child interactions after a reduction of the staff-child ratio for toddler-age children. Gevers Deynoot-Schaub and Riksen-Walraven (2005) found no association between the global quality score of care and education for children and the staff-child ratio. Similarly, no relationship between the quality of early childhood education and the staff-child ratio was reported in a study in Portugal (Barros & Aguiar, 2010). Thus, studies on the associations between the quality of centre-based childcare and education and the staff-child ratio have yielded different findings.

We hypothesize that there is a negative association between the structural feature of staff-child ratio and the quality of care and education for toddlers in Hong Kong. To evaluate the validity of this hypothesis, we have to identify and control for the demographic and other structural characteristics of the compared classrooms that may affect the quality of care and education for toddlers.

The education and training of staff is one structural feature that may be influential. Better educated and trained teachers can undoubtedly provide higher quality of care and education for children than those with less education and training (La Paro et al., 2009; Organization for Economic Co-operation and Development [OECD], 2012). Phillips, Mekos, Scarr, McCartney, and Abbott-Shim (2000) suggested that teachers' wages might also influence the process quality of childcare and education. The findings on the association of care and educational quality with teachers' age and experience are conflicting, with some studies showing no association, while others suggest a negative association or a positive association (Barros & Aguiar, 2010).

The type of centre has been found to be associated with the quality of childcare and education, with non-profit childcare centres attaining higher scores in quality measurement (Barros & Aguiar, 2010; Gevers Deynoot-Schaub & Riksen-Walraven, 2005). Norris and Guss (2016) found that the quality of health and safety practices was generally better in high-resource classrooms with sufficient funding. The demographic profiles of children can affect the quality of centre-based care and education. The performance and behaviour of children in class vary with their gender, ethnicity, language skills, and family backgrounds.

Boys' and girls' peer groups exhibit different play and interactive styles (Fabes, Hanish, & Martin, 2003), and ethnic differences can also affect the social interactivity of children (Graham, Taylor, & Ho, 2009; Rubin, Bukowski, & Parker, 2006). Children's level of communications inherently related to their social skills. Poor expressive language is consistently associated with lower social abilities (Hawa & Spanoudis, 2014). The socioeconomic factor of family background has also been shown to be related to children's social capability or behaviour (Parke, Simpkins, McDowell, Killian, & Dennis, 2002).

Based on the above literature review, the effects of staff-child ratio on the quality of care and education for toddlers were examined by selecting two toddler classrooms with similar demographic profiles and other structural characteristics, thus controlling any potentially influential variables that might affect the quality of childcare and education. These controlled variables included the type of childcare centre; the qualifications, experience, and wages of childcare teachers; the age, ethnicity, home language, and gender of the children; and the socioeconomic background of their families.

In this study, the ITERS-R was used to assess the quality of toddler classes in two childcare centres with different staff-child ratios. The ITERS-R, which has been widely used in quality assessments of infant and toddler settings, is an observational measurement tool for use in the classroom environment for children from birth to 30 months (Harm, Cryer, & Clifford, 2006; Mangione et al., 2016; Norris & Guss, 2016). The instrument is user-friendly as assessors can acquire the skills with an acceptable level of reliability through the use of the training materials (Harms et al., 2006).

The ITERS-R scale consists of 39 items, organized under the 7 subscales of "Space and Furnishings", "Personal Care Routines", "Listening and Talking", "Activities", "Interaction", "Program Structure", and "Parents and Staff". Each item is measured using a 7-point Likert-type scale, with descriptors for 1 (inadequate), 3 (minimal), 5 (good), and 7 (excellent). "Space and Furnishings" includes items on indoor space and furniture, provision for relaxation and comfort, room arrangement, and displays for children. "Personal Care Routines" assesses aspects of greeting and departing, meals and snacks, naps, diapering and toileting, and health and safety practices. "Listening and Talking" focuses on the language and books used in the classroom. "Activities" covers children's engagement in fine motor activities, active physical play, art, music, science and nature, blocks, dramatic play, sand and water play, use of video equipment, and promoting acceptance of diversity. "Interaction" includes supervision of play and learning, staff-child interaction, peer interaction, and discipline. "Program Structure" involves the schedule and structure of the day, and provision for children with disabilities. The "Parents and Staff" subscale was not included in the quality assessment of this study because its items rely on reports from parents and childcare teachers rather than observational assessment. As indicated by the authors of the ITERS-R instrument, an "All Child Items" version of the ITERS-R excluding "Parents and Staff" could be used for the quality measure (Harms et al., 2006).

3. Research Methods

In 2017, there were totally 23 non-profit and 17 private childcare centres, crèches and kindergarten-cum-childcare centres (collectively referred to as childcare centres hereafter) to provide services to children from birth to two years of age in Hong Kong (Hong Kong Social Welfare Department, 2017). The current minimum staff-child ratio for childcare centres in Hong Kong is 1:8, which was stipulated by the Hong Kong Social Welfare Department in 1976 and has not been revised since then.

Of 23 full-day childcare centres contacted by phone, 15 agreed to participate in the study and provided the basic information about their adopted staff-child ratios. Childcare Centre 1, which is run by a non-profit organization to serve children from families of higher socioeconomic status (SES), is a pioneer childcare centre in Hong Kong that has adopted a lower staff-child ratio of 1:5 from 2015 onwards. Childcare Centre 2, with a staff-child ratio of 1:7, was selected for the comparative study as it is also a non-profit childcare centre serving higher SES families and is located in a district with a similar socioeconomic class to Childcare Centre 1.

Formal invitation letters describing all of the study features were sent with consent forms to the principals, childcare teachers and parents of these two centres. Upon receipt of the completed consent forms, a questionnaire survey was conducted to collect the demographic information on the childcare teachers and the children, together with the structural features of the classes in each centre.

The teachers were asked to provide information about their qualifications, years of experience, and wages, in addition to demographic information about the children including their age, sex, ethnicity, home language, and any problems with language, behaviour, and disability.

The response rate was 100%. All of the returned questionnaires were completed in order with no frivolous responses. The collected questionnaires were coded and processed by statistical means. Two toddler classrooms exhibiting similar demographic profiles and structural characteristics were selected for the ITERS-R observational assessment, enabling the features and variables that might affect the quality of care and education for children in the comparative study to be controlled. These controlled features and variables were as follows:

- (i) Both childcare centres were non-profit centres, providing eight hours of services per day.
- (ii) Both childcare centres were high-resource centres with sufficient funding for their services.
- (iii) Both childcare centres were located in districts with families of higher SES.
- (iv) All of the childcare teachers in both classrooms were qualified and registered practitioners, and held similar qualifications in early childhood education.
- (v) All of the childcare teachers in both classrooms were female, Chinese, and spoke Cantonese as their home language.
- (vi) The childcare teachers in both classrooms had over seven years of experience in the field and received a monthly salary in the range of HKD23,970-30,945 (USD3,000-4,000) in 2016.
- (vii) The selected classrooms served toddlers of the same age group, from 12 to 24 months.
- (viii) The selected classrooms adopted small group size, which based on the adopted staff-child ratio, for care and learning activities.
- (ix) The toddlers in both classrooms were all of Chinese ethnicity and spoke Cantonese as their home language.
- (x) The gender compositions of the two toddler classrooms were about the same, with 36% males and 64% females in the selected classroom in Childcare Centre 1, while the classroom in Centre 2 comprised 37% males and 63% females.
- (xi) Neither of the toddler classrooms had children with disabilities or behavioural or language problems.

The researcher and her research assistant were the observers in this study. The researcher holds a doctorate degree in early childhood education and her research assistant has a bachelor degree in early childhood education. Both were trained in the proper use of the ITERS-R through the use of training materials and videos recommended by the authors of the instrument (Harms et al., 2006). A trial run of the measure was conducted in a randomly selected childcare centre to familiarize the researcher and her assistant with the use of the scale before the commencement of the study.

After obtaining written consent from the participating childcare teachers and parents, the quality of the two selected toddler classrooms (Toddler Classroom 1 in Childcare Centre 1 and Toddler Classroom 2 in Childcare Centre 2) was measured in mid-2017. Observational data for each classroom were collected over a two-day period with no more than two weeks between each observation day. The classrooms were observed in the morning between 9:00 am until lunch time on one day and in the afternoon between 2:00 pm until the end of school hours on the other. The observers spent over three hours each day in the classrooms, and assessed the observational items in accordance with the ITERS-R guidelines and methodology. The childcare teachers were asked to behave as they usually would in the classroom during the observation period. The childcare teachers from the two toddler classrooms were invited to attend an in-depth interview after the observation sessions to obtain qualitative information on items not observed under the protocol of the ITERS-R.

The topics of the interview questions included the daily care and learning routines and activities that are most and least affected by staff-child ratio, problems with the current staffing situation, and the desirable staff-child ratios for improving the quality of care and education for children. Each interview lasted about 30 minutes, and was audio taped and transcribed. Analytical notes were written after each interview to ensure that the collected information was useful, reliable, and authentic. The information was then analysed through a process of coding and content analysis. International research ethics standards were observed to ensure that the rights, dignity, and welfare of the participants were respected in the study.

The participating childcare teachers and parents were informed of the data collection methods and activities. All participants were required to complete consent forms before the survey and observational study commenced. The anonymity of the participants in the study was preserved. All of the completed questionnaires and interview records were securely stored to ensure the confidentiality of the collected information.

4. Findings and analysis

The selected Toddler Classroom 1 had 3 childcare teachers and 14 children, giving a staff-child ratio of about 1:5. Toddler Classroom 2 had 4 childcare teachers with 27 children, giving a ratio of about 1:7. The group size of both classrooms followed the staff-child ratio, i.e., a group size of 4 or 5 in Classroom 1 and of 6 or 7 in Classroom 2.

The psychometric characteristics of the ITERS-R instrument were examined to determine its reliability in the quality assessment process in the new cultural and linguistic environment of Hong Kong. Cronbach's Alpha (α) coefficients were computed to assess the degree of internal consistency of the ITERS-R scale and its subscales in measuring toddler classroom quality. The results are presented in Table 1.

Table 1. Cronbach's Alpha coefficients of the ITERS-R measurement in the two toddler classrooms

Subscale / Dimension	Cronbach's Alpha (α)
Space and Furnishings	0.90
Personal Care Routines	0.97
Listening and Talking	0.90
Activities	0.95
Interaction	0.94
Program Structure	0.81
All Child Items (Total)	0.98

The Cronbach's Alpha (α) value of all child items measured in the two toddler classrooms was .98, with a range of .81 to .97 among the subscales, indicating a high level of internal consistency in the ITERS-R measurements. The results showed that there was a high degree of confidence that the ITERS-R tool was applicable to the quality measurement of the two toddler classrooms in the cultural and linguistic environment of Hong Kong.

The researcher and her assistant conducted the observational assessment on the care and educational quality of each classroom. The weighted Cohen's Kappa (κ_w), which is applied to ordinal variables in the measurement, was computed to determine the degree of agreement between the two observers' ratings of the ITERS-R items. The κ_w value was .641, with a significance of $p=.000$, which statistically represents a good agreement between the two observers' rated scores in the ITERS-R measurement.

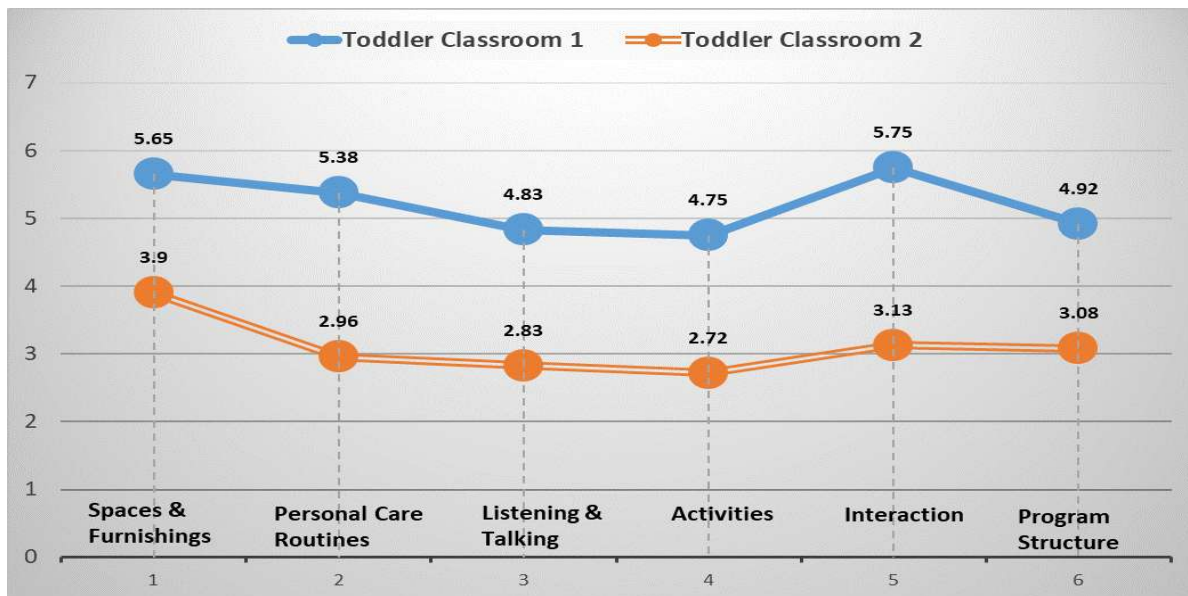
Table 2 presents the ITERS-R scores for different subscale categories and all child items of the two toddler classrooms. Toddler Classroom 1 had a mean (M) score of 5.18 with a standard deviation (SD) of 1.19 for all child items, which suggests "good" quality. The means of the subscales ranged from 4.75 to 5.75, with SDs from .58 to 1.64. The results indicated that Toddler Classroom 1 broadly implemented appropriate and good practices for care and education of toddlers and adequately met children's needs across the ITERS-R subscales. At the item level, the means ranged from 2.00 for "Nap" to 6.50 for "Room arrangement", "Greeting/departing", and "Meals/snacks" items.

Table 2. Results of the ITERS-R measurement in the two toddler classrooms

Subscale / Dimension	Toddler Classroom 1		Toddler Classroom 2	
	M	SD	M	SD
Space and Furnishings	5.65	0.75	3.90	1.17
Personal Care Routines	5.38	1.64	2.96	0.69
Listening and Talking	4.83	0.94	2.83	0.39
Activities	4.75	1.20	2.72	0.81
Interaction	5.75	0.58	3.13	0.72
Program Structure	4.92	1.00	3.08	0.67
All Child Items (Total)	5.18	1.19	3.07	0.89

Toddler Classroom 2 had a total mean score of 3.07 with an SD of .89, indicating that the quality was “minimal”. The means of the subscale scores ranged from 2.72 to 3.90, with SDs from .39 to 1.17. At the item level, the mean scores ranged from 2.00 for the “Nap” and “Promoting acceptance of diversity” items to 5.50 for the “Indoor Space” item. These results indicated that the practices in Toddler Classroom 2 minimally met the requirements and responded to children’s basic developmental needs only.

Figure 1 provides a comparison of the ITERS-R subscale scores of the two toddler classrooms. The discrepancy between the scores indicates the degree to which the staff-child ratio affect the quality of childcare and education. A higher discrepancy indicates a greater effect on the quality of the subscale items, and vice versa. The “Interaction” subscale showed the largest difference in scores (2.62) between the two toddler classrooms, indicating that the effect on quality was significant. The score differences for the remaining subscales, in descending order, were “Personal Care Routines” (2.42), “Activities” (2.03), “Listening and Talking” (2.00), and “Program Structure” (1.84). The “Space and Furnishing” subscale, with the lowest difference of 1.75, was the least affected by the staff-child ratio.

**Figure 1. Comparison of the ITERS-R quality scores for the subscales**

Analysis of the ITERS-R individual item scores revealed that the performance of Toddler Classroom 1 was very good in terms of “Room arrangement”, “Greeting/departing”, and “Meals/snacks”, which scored 6.5 in the assessment, while the poorest performing items were “Nap” and “Promoting acceptance of diversity”, which scored 2.0 and 2.25, respectively. For Toddler Classroom 2, the best-performing dimensions were “Indoor space” and “Room arrangement”, which scored 5.5 and 4.5 respectively, while the poorest performing items were “Nap” and “Promoting acceptance of diversity”, both of which scored 2.0.

The low scores for “Nap” in both classrooms were due to inappropriate provisions for nap, such as a crowded sleeping area that had less than 36 inches between cribs, and presence of bright lights and loud noise during nap times. Little evidence of racial or cultural diversity was observed in the teaching and learning materials of either classroom, resulting in the low scores for “Promoting acceptance of diversity”.

The top five items with the greatest discrepancies in quality scores between the two toddler classrooms are presented in Figure 2. Items with a high discrepancy in ITERS-R scores are most affected by the staff-child ratio. The items most affected, in descending order, were “Staff-child interaction” (3.50), “Active physical play” (3.25), “Supervision of play and learn” (3.00), “Meals/snacks” (2.75), and “Safety practices” (2.75).

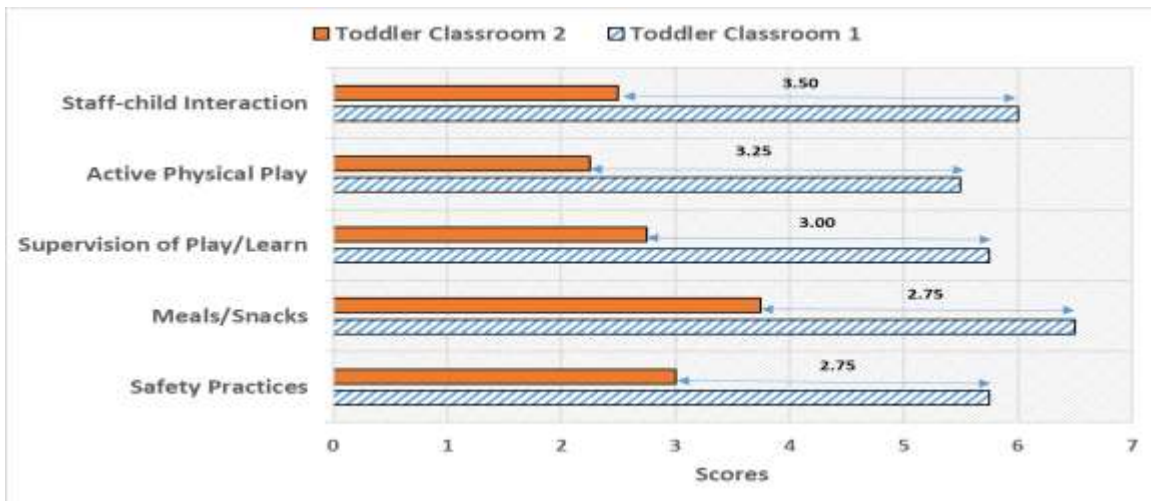


Figure 2. Top 5 items with greatest discrepancies in ITERS-R quality scores

The five items with the smallest discrepancies in ITERS-R quality scores between the two toddler classrooms are presented in Figure 3. From least to most significant, the items were “Nap” (0), “Promoting acceptance of diversity” (0.25), “Indoor space” (0.50), “Schedule” (1.50), and “Provision for relaxation and comfort” (1.50).

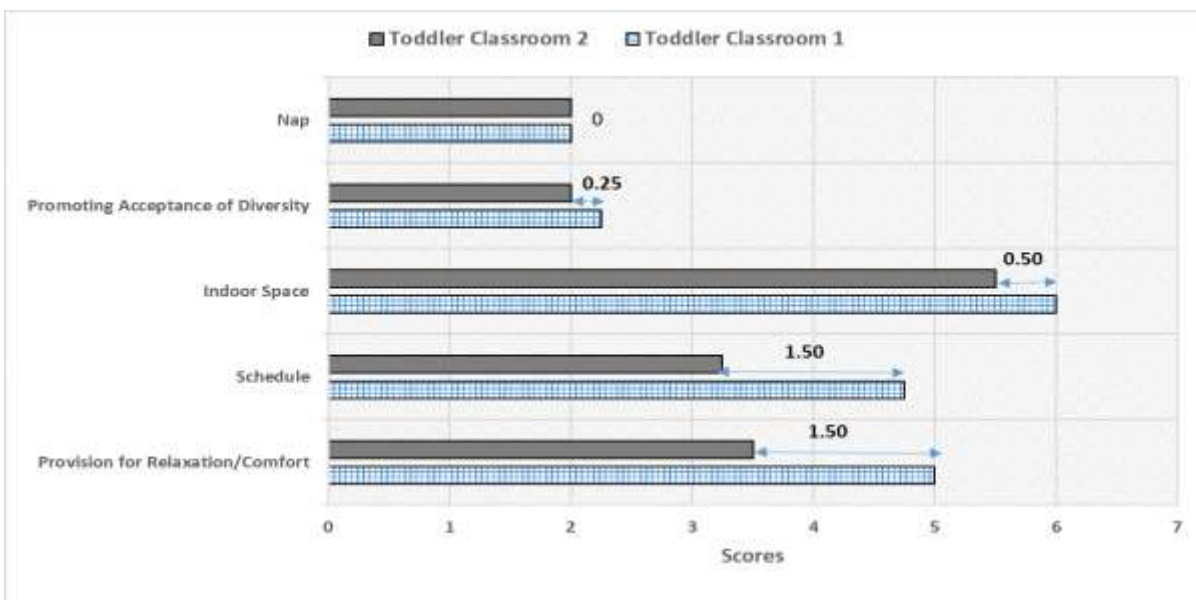


Figure 3. Top 5 items with smallest discrepancies in ITERS-R quality scores

Interviews

Interviews were conducted with three childcare teachers in Toddler Classroom 1 (coded Teachers 1A, 1B, and 1C) and four childcare teachers in Toddler Classroom 2 (coded Teachers 2A, 2B, 2C, and 2D) after the ITERS-R observational measurement, and the findings are summarized in the following paragraphs.

When asked about the staffing situation and the adequacy of the staff-child ratios in their childcare centres, Teachers 1A, 1B, and 1C were satisfied with the existing ratio of 1:5. Teacher 1A made the following comments:

Since our centre reduced the staff-child ratio to 1:5 two years ago, the quality of care and education for children has improved a lot. We have more time to take care of children's individual needs, especially those with behavioural problems. Our morale and motivation to provide better care for children have been substantially enhanced since the reduction of the ratio.

On the same issue of the adequacy of staff-child ratio, Teacher 2B was satisfied with their existing ratio of 1:7, as she considered it to be better than the minimum requirement of 1:8 adopted by most childcare centres in Hong Kong. However, the other three teachers in Toddler Classroom 2 hoped to have the staff-child ratio further reduced to 1:6 or 1:5 to relieve pressure at work and to improve the quality of their interactions with children. Teacher 2A made the following comments:

We need to provide toddlers with more care and attention as they are very young and less able to communicate with adults for their needs. Some children often become aggressive, angry, or upset in the play and learn activities. A lower staff-child ratio would enable us to have sufficient interaction with children to meet their different developmental needs.

When asked about the areas most likely to be affected by the staff-child ratio, Teacher 2C opined that personal daily routines for toddlers during meal and snack times would be significantly affected if there were not enough staff in the class. She commented as follows:

I feel great pressure during meal and snack times. There are many occasions when several toddlers are asking for food at the same time. Some children will cry immediately if they are not provided with food at the same time as their peers. Moreover, it is common for toddlers to spill their food and drinks, making their clothes dirty and the area messy. We also need to keep a close eye on their swallowing and individual allergies to certain kinds of food.

On the same issue regarding the areas most commonly influenced by the staff-child ratio, Teacher 1C pinpointed the routines of toileting and diapering with the following comments:

I can only take two or three children to the washroom for toileting or change the diaper of a child at one time, during which the remaining children in my group will be looked after by my colleague. If the staff-ratio is low, it is not a problem for my colleague to take care of a few children in my group for a short period of time. Otherwise, I have to rush back to the classroom and the children will not have enough time for defecation.

The interviews revealed that the safety of children was also significantly affected by the staff-child ratio. Most of the teachers pointed out that the physical abilities of toddlers could differ considerably even when they are only a few months apart in age, which requires staff to be highly attentive to the safety of children in class. When a teacher focuses on one child's behaviour while temporarily ignoring the others, accidents can occur. Teacher 2D voiced out the following comments:

There are great differences in physical development among toddlers in the class. In the same classroom, some toddlers cannot walk so well and easily fall on the floor, whereas some can already run and jump. Some children are very active and always play aggressively, biting and hitting others anytime they like. A low staff-child ratio would help prevent accidents as we could be more focused on looking after a small group of children.

The interviews also revealed that health was another area significantly affected by the staff-child ratio. Teacher 1C mentioned that her childcare centre had particularly emphasized the importance of health in the daily routines.

Parents are very demanding in the safety and health care of their children. This makes us focus our attention more on the personal care of children, especially the strict hygiene practices implemented after the outbreak of atypical pneumonia in 2003. The environment and settings for children are frequently cleaned and disinfected. We also have to ensure children have their hands washed before and after meals, and after toileting or touching potentially contaminated items. A low staff-child ratio can enable us to keep up with the stringent hygiene practices for children.

When asked about the areas less likely to be affected by staff-child ratio, Teachers 1A, 1C, 2B, and 2D were of the view that the quality of care during the toddlers' nap time was least affected by the ratio. Teacher 1A made the following comments:

We feel a bit relaxed during the children's nap time. We arrange nap time after lunch, and children can fall asleep quickly after eating. Children are left in cribs and they can sleep well by themselves. One of our team members can look after all the children during their nap. My fellow teachers and I usually take a lunch break during the children's nap time.

5. Discussion

The results of the study reveal that the ITERS-R measure presents adequate psychometric characteristics in this study. The computed Cronbach's Alpha (α) values indicate a high degree of confidence in the effectiveness of the ITERS-R tool for measuring the quality of the two toddler classrooms in the specific societal and cultural environment of Hong Kong. The weighted Cohen's Kappa (κ_w) value suggests a good strength of agreement between the judgments of the two observers in the ITERS-R quality measurement of the two toddler classrooms.

The quality measurement results show that Toddler Classroom 1 has a total mean score of 5.18, which suggests "good" global quality, while the mean for Toddler Classroom 2 is 3.07, indicating "minimal" global quality. As the staff-child ratio in Toddler Classroom 1 is about 1:5 compared with 1:7 in Toddler Classroom 2, the results suggest that the global quality of a toddler classroom is negatively associated with its staff-child ratio, under the condition that the classrooms have similar demographic profiles and other structural characteristics.

Using the same ITERS-R quality measurement, the total mean score for Toddler Classroom 1 is higher than the means reported for the Netherlands ($M=3.40$) (Vermeer et al., 2008), Germany ($M=3.21$) (Tietze & Cryer, 2004), Greece ($M=3.50$) (Petrogiannis, 2002), and the U.K. ($M=4.40$) (Mathers & Sylva, 2007), while for Toddler Classroom 2, it is more or less the same as reported in these countries. The abovementioned Western countries generally have a lower staff-child ratio than in Hong Kong. For example, in the U.K. the staff-child ratio is 1:4 for two-year-olds, and is reduced to 1:3 for infants and toddlers under the age of two (U.K. Department for Education, 2017). In the Netherlands, the staff-child ratio is 1:6 for children aged two and 1:4 for those under two. Taking the effects of different staff-child ratios into consideration, both of the toddler classrooms in Hong Kong attain better ITERS-R quality scores than these Western countries, particularly for the dimension of "Personal Care Routines", probably because they are high-resource classrooms operated by non-profit childcare centres and serve children from families of higher SES. In addition, since the outbreak of atypical pneumonia in 2003, childcare centres in Hong Kong have become more conscious of upholding high health standards and implementing stringent hygiene requirements and practices in care of children, contributing to the higher scores for "Personal Care Routines".

The analysis of the discrepancy of the ITERS-R scores between the two toddler classrooms in Figure 1 indicates that the effects of the staff-child ratio are the most significant for the "Interaction" subscale, followed by "Personal Care Routines", "Activities", "Listening and Talking", and "Program Structure". The "Space and Furnishing" subscale is the least affected by the ratio. The results indicate that the process quality based on childcare teachers' direct interactions with and personal care of children is more positively affected by the staff-child ratio than quality related to the provision and furnishing of learning materials, equipment and space, and the schedule of learn and play activities. The analysis of results at the item level reveals the extent of the effects of staff-child ratio on the quality of specific areas. The areas most affected, in descending order of significance, are (a) Staff-child interaction, (b) Active physical play, (c) Supervision of play and learn, (d) Meals and snacks, and (e) Safety practices.

A lower staff-child ratio can thus provide more opportunities for children to interact with staff, develop their physical and literacy skills, cultivate good dining habits, and reduce the risk of accidents in class. In contrast, the areas least affected by staff-child ratio, from least to most, are (a) Nap, (b) Promoting acceptance of diversity, (c) Indoor space, (d) Schedule, and (e) Provision for relaxation and comfort. The qualitative analysis of the interviews with the childcare teachers is broadly consistent with the findings from the ITERS-R measure on the areas that are most and least likely to be affected by the staff-child ratio.

Lowering the staff-child ratio has cost implications. The minimum cost for adding a staff member in Toddler Classroom 2, to lower its staff-child ratio to 1:5.4, is about HKD18,400 (USD2,360) a month, which is the average starting salary of a qualified childcare teacher in 2017. If this cost were compensated through an increase in school fees, parents would have to pay an extra of about HKD682 (USD88) a month for their child in Toddler Classroom 2. As the staff-child ratio is negatively associated with the quality of care and education for toddlers, lowering the ratio would represent a trade-off between the quality level of care and education required for toddlers and the additional costs that service providers and parents can afford.

6. Limitations and Implications for Practice

Several limitations of the present study should be noted. First, the sample size is small. Only two toddler classrooms exhibiting highly similar demographic features and characteristics were recruited for the study. Future research should scale up the study by including more childcare centres with similar demographic profiles and characteristics. Second, the influence of the slight variation in the matching features of the controlled variables on the quality of care and education between the two toddler classrooms could not be eliminated.

Despite these caveats, the present study contributes to the literature of early childhood research in important ways. It is the first of its kind to use the ITERS-R methodology to explore the impacts of staff-child ratio on the quality of care and education for children in the Greater China Region. The study provides information on the applicability of the ITERS-R to quality measurement in Hong Kong toddler classrooms adopting different staff-child ratios. A negative association is found between the quality of care and education for toddlers and the staff-child ratio. At the subscale level, it is revealed that the effects of staff-child ratio are significant for the “Interaction”, “Personal Care Routines”, and “Activities” dimensions. At the item level, the ratio has the greatest effects on the items measuring staff-child interaction, active physical play, supervision of playing and learning, provision of meals and snacks, and safety practices.

7. Conclusions

The quality of care and education for children makes a difference to children’s developmental outcomes. Examining the quality of centre-based care and education for children in terms of staff-child ratio is important, as government and service providers can glean useful information for formulating policies for further improvement. The study reveals the impacts of staff-child ratio on various aspects of the quality of care and education for toddler-age children. Although reducing the staff-child ratio may have funding implications for childcare centres, the government and service providers should review their policy and practice in adopting an appropriate staff-child ratio for achieving a higher quality of early childhood educational services. Investment in lowering the staff-child ratio to improve the quality of care and education for our very young children would definitely benefit the economy and society.

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