

A comparison of child development, growth and illness in home-care and day-care center settings

Child
development,
growth and
illness

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Abstract

Purpose – Childcare is an essential part of early life environment that has a significant influence on lifelong physical and mental health. This study aimed to examine the relationship between development, growth and frequency of illness in different types of care.

Design/methodology/approach – This cross-sectional study recruited 177 children aged 30–36 months and their caregivers. Of these 66 were being cared for at home and 111 were attending out-of-home day-care facilities. An interview form, growth measurement and the Denver Developmental Screening Test II were collected. The association between child developmental, growth and illness variables was analyzed with Chi-square, Fisher's exact and Mann–Whitney U tests.

Findings – This study found that the development and growth results did not show statistically significant differences between the home-care and day-care groups. The number of minor illnesses was significantly lower in home-care children than in day-care children (OR = 0.33, 95% CI = 0.15-0.72).

Research limitations/implications – This study indicated that the risk of infection is increased in the children attending day care. Provision of a healthy and safe childcare environment needs to be an essential health promotion strategy to improve family and child well-being.

Originality/value – As the number of women's participation in the labor market has increased rapidly over the past decades, so did the number of children in nonparental care. The study findings reflect that the development of a day-care center for children was unclear, whereas the risk of infection was increased. Therefore, provision of a healthy and safe childcare environment needs to be an essential health promotion strategy to improve family and child well-being.

Keywords Childcare, Child's development, Home care, Day care, Thailand

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Introduction

As stated in many cross-culture reports, the number of women participating in the labor market has increased rapidly over the past decades and this coincides with the increased number of children in nonparental care [1–4]. In Thailand, a study by the Office of the Permanent Secretary for the Ministry of Education in 2017 showed that almost 90% of children under three years old were in some form of nonparental care. There are many different types of care. Some consist of in-home care, where a relative or other adult comes to the child's home; childcare homes, where an adult or adults provide care in their own homes; and childcare centers, where children receive care from adults at a nonhome location, such as a traditional day-care center [3].

As research has shown, the brain is more susceptible to the experiences of the first years of life. Early life exposures influence lifelong physical and mental health that can be either beneficial or deleterious in their effects [5–7]. On the one hand, it is assumed that childcare centers provide stimulating environments, which offers the opportunity to meet other children, experience a variety of daily activities and be cared for by certified staff; on the other hand, childcare staff might not be able to devote adequate attention to each child. Bearing these issues in mind, many parents struggle to find the right option when arranging childcare. Finding the right environment has a significant influence on childhood experience and determines whether the childcare facility benefits the children or disrupts their health and development.

Previous studies found that children gain developmental benefits from childcare over the short and long term, particularly in the areas of language and social development [3, 8–11]. A longitudinal study carried out by the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care, begun 1991, has shown that the children who attended childcare centers had better cognitive and language development skills [3]. As regards social competence, children who spent time in childcare centers manifested more self-confidence, were more likely to use self-directed emotion regulation behaviors and exhibited less distress in new situations [12, 13]. However, stress is an important concern as the child needs to deal with novel situations, to relate to strange adults, an unfamiliar peer group and experience the fear of being away from parents. Many articles have reported that cortisol levels are higher in day-care children than in home-care children, which may be associated with emotional development and behavior. However, the relationship with long-term effects for the health and development of children is not conclusive [2, 14–16]. Some evidence has indicated that attending childcare centers can have negative health consequences. Children attending childcare centers experience a higher number of common communicable diseases, especially respiratory and gastrointestinal infections when compared with children who are cared for at home. For children younger than two years of age attending childcare centers, the longer the duration of time spent in childcare, and the greater the child–teacher ratios, the rates of illness correspondingly increase [17–21].

Although there are many studies about childcare type, it is still challenging for parents and healthcare providers to find reliable research-based information due to much of the previous research being focused on a specific problem. To resolve this issue, this research examined the overall issues that included how differences in childcare experiences are related to the development, growth and health of children in the same context. We also explored the main reasons for enrolling the child in a day-care program and the characteristics of their ideal arrangements.

Methodology

Study design, procedure and participants

This investigation was a cross-sectional study. Data were gathered from children between 30 and 36 months of age and their parents who lived in Chiang Mai Province between November

2017 and July 2018. The children were grouped into two by type of childcare arrangement: care by a relative or a nonrelative in the child's own home (home-care children, $n = 66$) and supervision by someone at day-care centers that provide all-day programs (day-care center children, $n = 111$). The day-care center children were required to have attended the center continuously for at least six months.

Measures

The data around the following parameters were analyzed: caregiver and child demographic development, growth, experience and frequency of illness in the past two months, the main reasons for enrolling the child in a day-care program and the characteristics of their ideal arrangements. The study tools used were semistructured and open-ended questionnaires. The Denver Developmental Screening Test II (DDST) was used to screen children's development in four areas of functioning: fine-motor-adaptive, gross motor, personal-social and language skills [5, 6]. A subinvestigator, a nurse, who was trained and certified in the performance of the DDST, conducted all interviews, growth measurements and child developmental examinations. The growth chart used in our study was derived from the maternal and child health handbooks provided by the Ministry of Public Health of Thailand [22]. For height and weight, we divided the height-for-age and weight-for-age into three groups: the 97th percentile (+2SD), under the 3rd percentile (-2SD) and the 3rd-97th percentile to represent the normal and abnormal groups.

Data analyses

All answers were coded and recorded in an electronic database by two investigators. The Statistical Package for Social Sciences (SPSS) for Windows software application program version 22.0 was used for data analysis. Descriptive statistics frequencies, means and standard deviations were used to describe sample characteristics and illness experiences and the child developmental examination and frequency of illness of the sample. The Kolmogorov-Smirnov test was used to assess the normality of distribution. The association between child developmental variables was analyzed with a Chi-square test. If the data were not showing a normal distribution, we used Fisher's exact and the Mann-Whitney U tests.

Ethical consideration

The study was approved by the Research Ethics Committee of the Faculty of Medicine, Chiang Mai University, Thailand (No.035/2017, January 25, 2017). The parents or guardians of all participants gave informed consent.

Results

Demographic data of children and caregivers

Table 1 presents the demographic data of home-care children ($n = 66$) and day-care center children ($n = 111$). The mean age of the children was 30.6 ± 1.35 months for home-care and 32 ± 2.21 months for day-care center children. The mean age of children in the day-care center was significantly higher than those for home-care children ($p < 0.001$). As regards gender, 45.5% were male in the home-care group and 51.4% in the day-care center group. The primary caregivers were the mother (65.2% for home-care children and 53.2% for day-care center children), followed by grandparents (19.7% for home-care children and 23.4% for day-care center children), father (9.1% for home-care children and 15.3% for day-care center children) and others (6.1% for home-care children and 8.1% for day-care center children). The mean age of caregivers was 39.1 years for home-care children and 37.7 years for day-care

Parameters		Home-care children (<i>n</i> = 66)	Day-care children (<i>n</i> = 111)	<i>p</i> -value
Children	Age, month, mean \pm SD	30.6 \pm 1.35	32.0 \pm 2.21	<0.01 ^{a,**}
	Sex, <i>n</i> (%)			
	Male	30 (45.5)	57 (51.4)	0.49 ^b
	Female	36 (54.5)	54 (48.6)	
Caregiver	Relationship of the primary caregiver to children, <i>n</i> (%)			
	Mother	43 (65.2)	59 (53.2)	0.43 ^b
	Grandparent	13 (19.7)	26 (23.4)	
	Father	6 (9.1)	17 (15.3)	
	Other	4 (6.1)	9 (8.1)	
	Age, year, mean \pm SD	39.1 \pm 12.65	37.7 \pm 12.33	0.55 ^a
	Major caregiver's level of education, <i>n</i> (%)			
	Lower than graduation from high school	33 (51.6)	50 (46.3)	0.50 ^b
	Graduated high school	31 (48.4)	58 (53.7)	
	Household type, <i>n</i> (%)			
Two-parent household	62 (93.9%)	92 (82.9%)	0.03 ^{b,*}	
Single-parent household	4 (6.1%)	19 (17.1%)		

Table 1.
Demographic data of
children and caregivers

Note(s): ^aAnalyzed with Mann–Whitney U test, ^bAnalyzed with Chi-squared test, **p* < 0.05 and ***p* < 0.01

center children. About 33 (51.6%) of the caregivers in the case of home-care children had an education level lower than graduation from high school, whereas 50 (46.3%) of the caregivers for day-care center children had an education level lower than high school graduation. Most caregivers came from a two-parent household (93.9% for home-care children and 82.9% for day-care center children). A two-parent household for home-care children was significantly higher than it was for day-care center children (*p* = 0.03). Enrollment ages for day-care centers were a minimum age of two months while the average age was 30 months.

Development and growth between home-care and day-care center children

A comparison of development and growth between home-care and day-care center children is shown in Table 2. Most children had a normal DDST result: no delay and a maximum of one caution item (77.3% of home-care children and 80.2% for day-care center children) followed by a suspect DDST result: two or more caution and/or one or more delay items (22.7% for home-care children and 19.8% for day-care center children). Most children had personal-social development in normal items (80.3% for home-care children and 84.7% for day-care center children), followed by caution items (19.7% for home-care children and 12.6% for day-care center children) and advanced items (0% for home-care children and 2.7% for day-care center children), respectively. Most children had fine-motor-adaptive development in normal items (69.7% for home-care children and 76.6% for day-care center children), followed by advanced items (19.7% for home-care children and 17.1% for day-care center children) and caution items (10.6% for home-care children and 6.3% for day-care center children). Most children had fine language development in normal items (54.5% for home-care children and 55% for day-care center children), followed by advanced items (24.2% for home-care children and 25.2% for day-care center children) and caution items (21.2% for home-care children and 19.8% for day-care center children). Most children had gross motor development in normal items (84.8% for home-care children and 78.4% for day-care center children), followed by advanced items (10.6% for home-care children and 12.6% for day-care center children) and caution items (4.5% for home-care children and 9% for day-care center children).

Regarding growth, most children had a weight between the 3rd and 97th percentile (93.9% for home-care children and 91% for day-care center children), followed by above 97th

Parameters		Home-care children (n = 66) n (%)	Day-care children (n = 111) n (%)	p-value	
Total	Normal	51 (77.3)	89 (80.2)	0.84 ^a	
	Suspect	15 (22.7)	22 (19.8)		
Personal -Social	Advanced item	0 (0)	3 (2.7)	0.19 ^b	
	Normal items	53 (80.3)	94 (84.7)		
Fine-motor- adaptive	Cautious item	13 (19.7)	14 (12.6)	0.50 ^a	
	Advanced item	13 (19.7)	19 (17.1)		
	Normal items	46 (69.7)	85 (76.6)		
Language	Cautious item	7 (10.6)	7 (6.3)	0.97 ^a	
	Advanced item	16 (24.2)	28 (25.2)		
	Normal items	36 (54.5)	61 (55.0)		
Gross motor	Cautious item	14 (21.2)	22 (19.8)	0.48 ^a	
	Advanced item	7 (10.6)	14 (12.6)		
	Normal items	56 (84.8)	87 (78.4)		
Growth	Weight	Cautious item	3 (4.5)	10 (9.0)	0.69 ^b
		3rd-97th percentile	62 (93.9)	101 (91.0)	
		Above 97th percentile	3 (4.5)	6 (5.4)	
	Height	Under the 3rd percentile	1 (1.5)	4 (3.6)	
		3rd-97th percentile	64 (97.0)	106 (95.5)	
Height	Above 97th percentile	0 (0)	2 (1.8)		
	Under the 3rd percentile	2 (3.0)	3 (3.7)		

Table 2. Comparison of development between home-care and day-care center children

Note(s): ^aAnalyzed with Chi-squared test, ^bAnalyzed with Fisher's exact test

percentile (4.5% for home-care children and 5.4% for day-care center children) and below the 3rd percentile (1.5% for home-care children and 3.6% for day-care center children), respectively. Most children had a height between the 3rd and 97th (97% for home-care children and 95.5% for day-care center children), followed by below the 3rd percentile (3% for home-care children and 3.7% for day-care center children) and above the 97th percentile (0% for home-care children and 1.8% for day-care center children).

Illness experience between home-care and day-care center children

The comparison of experience and frequency of illness in the past two months between home-care and day-care center children is shown in Table 3. The results found that the total numbers of minor illnesses in the home-care child are lower than those in the day-care center child (OR = 0.33, 95% CI = 0.15-0.72). Minor illnesses caused by infection were very common among both sets of children, 71.2% and 88.3% reported illness episodes in home-care and day-care center children, respectively. The common cold was the most frequent minor illness in both groups. Other minor illnesses among home-care children included fever and tonsillitis, whereas diarrhea, fever and hand, foot and mouth disease were the second, third and fourth most common diseases in the day-care center child. Total numbers of serious illnesses and the causes of illness were no different between home-care and day-care center children (OR = 0.42, 95% CI = 0.149-1.20). The first five serious illnesses causing hospital admission included the common cold, acute bronchitis, pneumonia, influenza and diarrhea.

Table 3.
Comparison of
experience and
frequency of illness in
the previous two
months between home-
care and day-care
center children

Parameters	Home-care children (<i>n</i> = 66), <i>n</i> (%)	Day-care children (<i>n</i> = 111), <i>n</i> (%)	OR	95% CI
Total number of serious illnesses (<i>n</i> = 23)	5 (7.6)	18 (16.2)	0.42	0.15, 1.20
Total number of minor illnesses (<i>n</i> = 145)	47 (71.2)	98 (88.3)	0.33	0.15, 0.72*
<i>Serious illness cause^a</i>				
Common cold	1 (1.5)	6 (5.4)		
Acute bronchitis	1 (1.5)	3 (2.7)		
Pneumonia	1 (1.5)	1 (0.9)		
Influenza	1 (1.5)	1 (0.9)		
Diarrhea	1 (1.5)	1 (0.9)		
<i>Minor illness cause^b</i>				
Common cold	44 (66.7)	87 (78.4)		
Diarrhea	0 (0.0)	5 (4.5)		
Fever	1 (1.5)	3 (2.7)		
Hand, foot and mouth disease	0 (0.0)	3 (2.7)		
Tonsillitis	1(1.5)	1 (0.9)		
Note(s): ^a , ^b We selected only the top five illnesses; * <i>p</i> < 0.05. Serious illness = The condition requires admission to a hospital. Minor illness = The condition does not require admission to a hospital				

Factors related to the child's development growth and illness

Factors relating to development and illnesses are presented in Table 4. The results found that the mean age of the primary caregiver was associated with the normal item in fine motor development (*p* = 0.046) and the frequency of serious illnesses (*p* = 0.026). The relationship of the primary caregiver to the child was associated with the frequency of serious illness in the past two months. The results found that the total numbers of minor illnesses were lower among the mothers as primary caregivers group than the grandparents as primary caregivers group (OR = 0.28, 95% CI = 0.14–0.76). Other factors, including the education level of the major caregiver and household type, were not associated with development and numbers of illnesses.

We also collected data pertinent to the reason for the participants enrolling their child into childcare and the factors for choosing their childcare facility. The most popular reason for enrolling a child into childcare was the parent needing to work with no other family support available to take care of the child (64.5%). This reason was followed by the wish to enhance their child's development (14.5%) and improve the child's social development (12.7%). The general factors for choosing the childcare facility were proximity to their home (45.9%), hygiene and cleanliness (17.1%) and safety and qualified day-care (10.8%) (Data not shown).

Discussion

Over the past decades, changes in family formation patterns have been observed. The proportion of females in the labor force is increasing worldwide. The numbers have nearly doubled in just over 30 years, 34.3% of mothers with children under the age of 3 were working in 1975 compared to 61.8% in 2008 [23]. This global phenomenon is reflected in an increasing number of child day-care center attendances [4,23–26]. Moreover, single-parent families are also increasing. Approximately 5–10% of children worldwide live in single-parent families. In Thailand, the number of single-parent families rose from 6.5% in 2001 to 8.3% in 2016 [27]. Our results indicated that day-care center children were more likely to be from single-parent

Relationship of the primary caregiver to children, n (%)

Parameters	Grandparent, n (%)		OR (95%CI)		Lower than graduation from high school n (%)		Graduated high school and upper n (%)		Primary caregiver's level of education, n (%)		Two parents n (%)		Household type: n (%)		Age of primary caregiver ³	
	Mother	n (%)	OR (95%CI)	OR (95%CI)	Lower than graduation from high school n (%)	Graduated high school and upper n (%)	OR (95%CI)	OR (95%CI)	Single parent n (%)	OR (95%CI)	OR (95%CI)	Mean + SD	Mean + SD	p		
<i>Development</i>	Personal-social	Normal	87 (86.1)	32 (84.2)	1.17 ^a (0.41, 3.29)	66 (80.5)	76 (87.4)	0.56 ^a (0.26, 1.38)	127 (83.6)	20 (90.0)	0.51 ^b (0.11, 2.31)	38.1 + 10.3	38.1 + 10.3	0.56		
		Cautious	14 (13.9)	6 (15.8)		16 (19.5)	11 (12.6)		25 (16.4)	2 (9.1)		39.9 + 14.2	39.9 + 14.2			
	Fine-motor-adaptive	Normal	67 (85.9)	34 (97.1)	0.18 ^b (0.02, 1.45)	63 (88.7)	64 (91.4)	0.74 ^a (0.24, 2.25)	111 (89.5)	20 (95.2)	0.43 ^b (0.05, 3.45)	38.9 + 12.1	38.9 + 12.1	0.046*		
		Cautious	11 (14.1)	1 (2.9)		8 (11.3)	6 (8.6)		13 (10.5)	1 (4.8)		32.6 + 11.3	32.6 + 11.3			
	Language	Normal	53 (74.6)	23 (71.9)	1.15 ^a (1.45, 2.94)	49 (70.7)	45 (77.6)	0.67 ^a (0.30, 1.50)	88 (75.2)	9 (56.3)	2.36 ^a (0.81, 6.90)	37.5 + 12.6	37.5 + 12.6	0.19		
		Cautious	18 (25.4)	9 (28.1)		21 (30.0)	13 (22.4)		29 (24.8)	7 (43.7)		39.9 + 12.2	39.9 + 12.2			
<i>Illness</i>	Gross motor	Normal	85 (94.4)	31 (91.2)	1.65 ^b (0.37, 7.29)	71 (93.4)	69 (90.8)	1.44 ^a (0.44, 4.56)	125 (91.2)	18 (94.7)	0.58 ^b (0.07, 4.72)	37.9 + 12.0	37.9 + 12.0	0.64		
		Cautious	5 (6.6)	3 (8.8)		5 (6.6)	7 (9.2)		12 (8.8)	1 (5.3)		36.2 + 12.7	36.2 + 12.7			
	Serious illness	Yes	9 (8.8)	10 (26.5)	0.281 ^a (0.14, 0.76)**	9 (10.8)	13 (14.6) ^a	0.71 (0.29, 1.76)	20 (13.0)	3 (13.0)	0.99 ^b (0.27, 3.66)	43.7 + 13.3	43.7 + 13.3	0.026*		
		No	93 (91.2)	29 (74.4)		74 (82.9)	76 (85.4)		134 (87.0)	20 (87.0)		37.4 + 12.1	37.4 + 12.1			
	Minor illness	Yes	82 (80.4)	34 (87.2)	0.60 ^a (0.21, 1.74)	70 (84.3)	70 (78.7) ^a	1.46 (0.67, 3.19)	127 (82.5)	18 (73.8)	1.31 ^a (0.45, 3.83)	38.1 + 12.7	38.1 + 12.7	0.57		
		No	20 (19.6)	5 (12.8)		13 (15.7)	19 (21.3)		27 (17.5)	5 (21.7)		38.6 + 11.3	38.6 + 11.3			

Note(s): ^aAnalyzed with Chi-square test, ^bAnalyzed with Fisher's exact test, ³Analyzed with Mann-Whitney U test, **p* < 0.05 and ***p* < 0.01

Table 4. Factors related to children's development growth and illness

households than in the case of home-care children. There is also a substantial increase in the number of dual-earning couples, and this increase, along with the single-parent increase, has meant a higher demand for childcare with day-care centers now providing an essential service for many families.

Questions about the possible impact of childcare on the development and health of young children are of enormous interest both to parents and to health professionals. Our results showed no evidence of a relationship between childcare type and the developmental skills of the children in the four main areas of development: personal–social, fine motor, language and gross motor. Referring to the results of previous studies and links between day-care experience and child outcomes show mixed results. Typically, the studies have demonstrated significant positive effects on the development of children from disadvantaged families attending high-quality early childhood programs [3, 8, 26, 28]. Family background and quality of day care were not controlled in our study and that may have had an impact on our results. Many studies found a positive impact of day care on language development and cognitive development [3, 8, 11, 28–30].

The NICHD longitudinal study indicated that children who attended day-care centers had somewhat better cognitive and language development than children who experienced other nonmaternal childcare arrangements [3]. This long-term study showed that children who experienced higher-quality early childcare displayed better vocabulary scores in the fifth grade than did children who experienced a lower quality of care [3]. Conversely, a study by Stolarova *et al.* [30] showed that girls not attending day care before the age of two years exhibited a larger vocabulary size in comparison to all other children [30]. As regards social development, some researchers found that attending childcare facilities in early childhood has positive effects [1, 26, 31]. Children in day-care centers were also more skilled with strangers and more autonomous of mothers in a laboratory playroom [1]. One observational study found that the closeness of the teacher–child relationship in preschool childcare was related to social skills through the elementary school years. A possible explanation is that children with a positive early experience with someone other than their parents learn a pattern of interacting that expedites their relationships with a future caregiver [26]. Many pieces of evidence are consistent in concluding that motor skills significantly improve with extended physical activity, but preschoolers' physical activity levels are always low during center attendance [32–36]. However, there is little documentation regarding how childcare types interact with the motor skills of children, so the relationship between childcare exposure and the development of motor skills has not yet been concluded. In our study, the relationship between childcare exposure and motor skills was not observed; nevertheless, we found an association between higher primary caregiver age and the normal result of fine motor skills. Similarly, Comuk-Balci *et al.* found that higher maternal age, especially in female gender children older than 24 months, and higher maternal education correlated with an earlier accomplishment of fine motor skills [37]. The consequence of higher parental age may involve greater intellectual levels and positive psychology in enhanced opportunities for the stimulation of the child.

The outcomes of the investigation into illnesses in this study are consistent with earlier studies in that day-care center children are at a higher risk of common infection [19, 21]. Moreover, our study showed the effect of the type of childcare on the severity of illnesses that have not been assessed in most previous articles. The results of our study indicated that the total number of minor illnesses that did not require hospital admission in day-care center children was significantly higher than in home-care children, whereas the incidence of serious illness that caused the child to be admitted to the hospital did not differ significantly between both groups. It is notable that the most common cause of serious illness in our study was the common cold, which is generally not considered to be a severe illness.

Like many similar studies, our results demonstrated that day-care attendance significantly increases the risk of respiratory and gastrointestinal tract infections, which are typically transmitted via airborne droplets, direct contact with secretions or feral-oral transmission [21, 38–40]. Good personal hygiene and a clean environment are essential to reduce the spread of infections in childcare settings. Children need to learn about and practice personal hygiene, such as consistently washing their hands and covering their mouths with a tissue or upper sleeve during coughing or sneezing. School policies should cover practical procedures for preventing the spread of infectious diseases, including cleaning of toys, diaper changing and food preparation. For example, toys that are contaminated by body fluids should be set aside until they are cleaned by hand with detergent, rinsed with water and air-dried. The soiled clothes should be stored in a sealed plastic bag and sent home with the child at the end of the day. A clear school protocol for children with common symptoms of childhood infection, which include fever, cough, runny nose or diarrhea, is essential. When children present with any of these symptoms, parents should keep their children home from school, or the teachers should call the parents to come and collect their children and take them home. The children need to be symptom-free for at least 24 h before returning to school. Immunization is a safe and effective intervention to reduce the transmission of infectious diseases. Therefore, policymakers should support the most up-to-date vaccination protocol for children and childcare staff. Furthermore, healthcare personnel should continuously support childcare services by providing health assessments and educate childcare staff to improve health and development outcomes [21, 38, 40, 41].

On the positive side, children who attended large day-care centers during the first three years of life had more frequent colds during the preschool years, but less frequent colds during their school years until reaching 13 years of age. Acquisition of immunity may develop earlier among children who participate in large day-care centers [18].

The use of our understanding of the relationship between child health and the type of day care, and knowing how parents make choices about childcare, is fundamental to developing effective services to promote the provision of high-quality care. Therefore, we also explored the main reasons for enrolling the child in a day-care program and the characteristics of their ideal arrangements. More than half of the participants sent their child to a day-care center because they needed to work and there was no other family support available to take care of their child. Only one-quarter of the parents expressed concern about the positive developmental influence of day-care centers. Not surprisingly, the ideal characteristics of the day-care centers related to issues regarding the convenience of a good location. Fewer than half of these parents considered hygiene, safety or the quality of day care as a primary choice.

There are many significant characteristics for day care cited in previous studies, which have examined issues around childcare choices such as quality of day care, the presence of caring caregivers and an environment where their children could learn. Factors affecting parents' day-care choices depend on educational level, ethnicity and family role beliefs. However, there are many limitations regarding opportunities for childcare including family finances, inflexible work schedules and locations, especially for low-income families [42–46].

Therefore, the quality of a day-care center may not always be a priority if the day-care facility did not meet the financial constraints and availability for the families. Similar to our investigation, other studies found that the quality of day-care center is not the first concern. There is a need to ensure all children have the opportunity to attend high-quality day care rather than just the most convenient. Beyond improving the quality of childcare in identifying family needs, the application of quality improvement strategies is also necessary.

As a study limitation, the period that children attended day care was too short to show any association between childcare exposure and growth. Thus, there is an opportunity for future studies to extend the study period and investigate any impact on growth.

Conclusions

A day-care center provides an essential service to many families, and the demand continues to increase. From our results, the developmental benefits of a day-care center for children are unclear, whereas the risk of infection is increased. Therefore, the provision of a healthy and safe childcare environment needs to be an essential health promotion strategy to improve family and child well-being. Pediatricians and healthcare providers should help provide perspective on these issues, including the risks and benefits of childcare to assist parents in making arrangements for what is best for their children and families. These findings also provide valuable information about policy implications.

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