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The impact of child care on child development in daycare and at home

Wpływ opieki przedszkolnej i domowej na rozwój dziecka

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Abstract

Background: The insufficient amount of time allocated by working parents is one of the causes of reduced interaction between parents and children. Consequently, the solution of entrusting children to daycare centres remains a choice. The development of children aged 3–72 months is extremely significant because the brain volume develops to reach 95% of the adult brain volume. This makes the stimulation provided by caregivers extremely important. This study aimed to identify differences in the development of children entrusted to daycare centres compared to the home care. **Methods:** The study was performed in Surabaya, Indonesia. The total sample was divided into 2 groups of children aged 3–72 months, one group was cared for at home, and the other in the daycare setting. The subjects were assessed using Indonesia's Prescreening Developmental Questionnaire (PDQ) to determine their development. The assessment was conducted twice, with the second evaluation taking place 6 months after the first analysis. **Results:** We analysed data from 193 children. The children cared for at home differed significantly (53.3%) from the children entrusted to daycare centres (38.8%) in the first assessment, while in the second assessment 44.4% of the former group experienced a disruption of their personal-social skills, compared 38.8% in the latter. Gross motor and speech-language skills changed significantly improved in 6 months' evaluations. **Conclusion:** There were no differences between the development of children being cared for at home and those that were entrusted to daycare centres over 6 months of continuous evaluation.

Keywords: child care, child development, daycare, home care

Streszczenie

Wstęp: Jedną z przyczyn ograniczenia interakcji rodzice–dzieci jest niewystarczająca ilość czasu, jaką aktywni zawodowo rodzice mogą przeznaczać swoim dzieciom. W związku z tym rodzice często decydują się na korzystanie z opieki przedszkolnej. Rozwój dzieci w wieku 3–72 miesięcy jest niezwykle istotny, ponieważ objętość mózgu osiąga wówczas 95% objętości mózgu dorosłego człowieka. Oznacza to, że stymulacja, jaką zapewniają dzieciom opiekunowie w tym okresie, odgrywa kluczową rolę. Celem pracy było określenie ewentualnych różnic w rozwoju dzieci korzystających z opieki w placówkach przedszkolnych w porównaniu z dziećmi objętymi opieką domową. **Metody:** Badanie zostało przeprowadzone w Surabai (Indonezja). Próbę badawczą podzielono na 2 grupy dzieci w wieku 3–72 miesięcy: dzieci z pierwszej grupy pozostawały pod opieką domową, a dzieci z drugiej grupy uczęszczały do przedszkola. Uczestników poddano ocenie rozwojowej według indonezyjskiego Kwestionariusza Przesiewowej Oceny Rozwoju. Ocenę przeprowadzono dwukrotnie. Druga ocena odbyła się po upływie 6 miesięcy od pierwszej analizy. **Wyniki:** Analizie poddano dane dotyczące łącznie 193 dzieci. U dzieci pozostających pod opieką domową w pierwszej ocenie stwierdzono znamienne częstsze występowanie zaburzeń w sferze kontaktów społecznych (53,3% vs 38,8%). W drugiej ocenie odsetek ten wyniósł 44,4% w porównaniu z 38,8% w grupie dzieci korzystających z opieki przedszkolnej. Na przestrzeni 6 miesięcy pomiędzy kolejnymi ocenami odnotowano znamienny rozwój motoryki dużej oraz umiejętności językowych i komunikacyjnych. **Wnioski:** Podczas 6-miesięcznej ciągłej oceny nie stwierdzono znamiennych różnic pod względem rozwoju dzieci pozostających pod opieką domową i dzieci przebywających w placówkach przedszkolnych.

Słowa kluczowe: opieka nad dziećmi, rozwój dziecka, przedszkole, opieka domowa

INTRODUCTION

Children represent a gift for every parent, and every parent wants and hopes that their children will grow and develop properly. Therefore, the role of parents as the main stimulation factor in the process of child development is very important. However, according to the World Health Organization (WHO), as many as 10–20% of children aged 13 and 14 experience development and growth disorders either mentally or physically⁽¹⁾. Development is defined as a continuous increase in the structures function supporting gross motors, fine motors, speech and language, as well as the personal-social aspect⁽²⁾. Development in children is usually followed by the suitability of capabilities according to age in receiving stimulation and associated with sensory ability to apply motor, cognitive, and personal-social responses⁽³⁾. As is well known, gross motor skills refer to movements that use large muscles and energy including physical activity, facial expression, and supporting the body⁽⁴⁾. Fine motor skills, in contrast, refer to movements that require small muscle coordination and good communication between the eyes and the hands⁽⁵⁾. Speech and language is a linguistic ability that includes thinking, reasoning, and memory processes⁽⁶⁾. The personal-social aspect comprises self-confidence, emotional feeling, including interaction/social experience⁽⁶⁾. Child development remains progressive for a period, and differences between individuals are observed. Although each individual has control over the developmental processes within themselves, the milestones still follow a consistent pattern and a specific sequence^(7,8). What needs to be understood in the principle of child development according to which growth and development are a form of collaboration between character and parenting; this combination involves genetic, biological, environmental, and experiential factors. Parenting is a process of introducing and supporting a child's physical, emotional, social and intellectual development from infancy to adulthood. The form of expression of child development is a process of physical and mental maturation. It should be noted that the development in children does not always go together or in parallel; for example, sometimes linguistic/cognitive development is faster than physical development at a given age. But the most significant aspects representing the child's primary development include physical, cognitive/linguistic, and socio-emotional factors⁽⁸⁾. The studied examples of developmental disorders and assertive behaviours that are influenced by genetic factors are intellectual disability or mental retardation. The busyness of parents who work is one logical reason. The interaction between parents and children is reduced, so developmental stimulation is disrupted⁽⁸⁾. The solution to entrust children to daycare centres is a choice. Although it is not uncommon for parents who work to experience their moment at night after being in employment or spending time on weekends⁽⁹⁾. To determine the development of children, one of

the early detection methods that we used in this study is Indonesia's Prescreening Developmental Questionnaire (PDQ). A study has shown that Indonesia's PDQ sensitivity is 60%, and it has a specificity of 92%; the results can be assumed if the possibility of under-detection of a child has a delay but is undetected⁽¹⁰⁾. Gender, occupations of parents, and socioeconomic conditions are unanalysed, as they are not the main focus of this study. In a study conducted by the National Institute of Child Health and Human Development (NICHD) in the United States; out of 1,000 family respondents with working mothers, it was proven that children entrusted to daycare centres or other caregivers were found to suffer many negative effects; although not a few also experienced a positive impact. However, research data on the usage of Indonesia's PDQ as a screening tool has not been used optimally in primary healthcare or by caregivers. This study, therefore, seeks to determine the child's development and analyse the role of parenting status among children at preschool age in the urban area in Surabaya, Indonesia.

METHODS AND DESIGN

Study design

This was an observational prospective study leveraged on primary data by using Indonesia's PDQ instrument for children at preschool age from the daycare centres and playgroups in Surabaya, Indonesia, collected between July 2018 and January 2019.

Study setting and sampling strategy

This study was conducted among 193 children aged 3–72 months, randomly in 4 daycare centres and playgroups in the urban area of Surabaya, Indonesia. The sample size was calculated based on the total sampling. The parenting status was confirmed through caregivers and children's data from the place. In this comparative study, the parenting status criteria in daycare centre represent a place for children who attend a kindergarten or playgroup, then after study is entrusted to daycare centre; or those who have been entrusted to a daycare centre since the beginning of the day. The care status at home represents a child who attends a kindergarten or playgroup, then they are picked up by the caregiver/parent; or children who have been cared for at home by the family/caregiver from the beginning. The mother's status of the subject is obtained through the child's data at the place where they attend school or directly for the caregiver.

Data management

The evaluation was conducted twice, with an interval of 6 months after the first data collection. We used Indonesia's PDQ as a developmental screening instrument for children

RESULTS

aged 3–72 months. This screening tool is approved by the Ministry of Health of Indonesia, and it is capable of detect the development of children in preschool age. Indonesia's PDQ includes 9–10 questions that can be completed by children and/or parents. The use of Indonesia's PDQ in children is adjusted to the age group. For children under 2 years, assessment can be carried out every 3 months, and over 2 years can be done every 6 months. For each point of evaluation, there are types of statements according to development categories like a gross motor, fine motor, speech and language, and personal-social; the evaluation points must be completed sequentially. This Indonesia's PDQ examination also utilises similar standardised instruments such as pencils, paper, tennis balls, rattles, 2.5 cm³ cubes, raisins, peanuts, small biscuit pieces from 0.5 to 1 cm, and illustrated cards. In determining the results of the screening, they were classified as normal when the child was able to do 9 or 10 evaluation points. They were categorised as suspect if the evaluation results were 7 or 8 points, and they were classified as delayed if the child was able to only do ≤6 evaluation points. There was no negative risk in this study because the evaluation of children using Indonesia's PDQ entails no risks.

Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 17. We utilised random samples collected from a similar population on 95% confidence intervals (CIs) or the significance level $\alpha = 0.05$. Several analyses were conducted including chi-square tests to determine the strength of the relationship between the parenting status and child's development. Analysis with the Mann-Whitney *U* test was used to compare the differences in the child's development with the parenting status. Analysis with McNemar's test was carried out to determine changes in the development of pre-post evaluations in children who were entrusted in daycare centres and cared for at home.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Health Research Ethics Committee of the Faculty of Medicine at the Airlangga University (IRB approval no. 105/EC/KEPK/FKUA/2019). Permission was sought from and granted by the National Unity, Political and Community Protection Agency of the Surabaya City (IRB approval no. 070/5049/436.8.5/2018), and the Surabaya City Department of Education (IRB approval no. 070/10272/436.7.1/2018). Site permission was then obtained from the head of the kindergarten/daycare centre at all 4 sites. Data collection commenced after all ethical and site clearance letters were received. Each subject's caregivers were assigned informed consent and information relating to consent before data was collected. All the subjects consented to participate in the study.

Data for a total sampling of 215 children aged 3–72 months were extracted, but the results are presented for 193 children who met the inclusion criteria for the study, with 90 children cared for at home, and 103 children entrusted to daycare centres. Tab. 1 shows that the majority of study subjects were followed by the age group of 37–48 months, with 59 children (30.6%); the second most age group represent 49–60 months, with 47 children (24.4%). While the age group that is most cared for at home is age 49–60 months, with 33 children (36.7%); for the age group 37–48 months, it is the most age group entrusted to daycare centres, with 30 children (29.1%). Based on gender, the highest percentage of children cared for at home is about 56 children (62.2%); while the women had the most significant percentage entrusted to daycare centres, with 44 children (42.7%). The dominant employment status of the subjects' mothers in this study was professionally active. However, the percentage of delayed development in children cared for at home is considerably higher than in those left in daycare centres – by 17 children (18.9%). The second evaluation conducted in January 2019 showed a significant similarity; where children cared for at home and daycare dominant considers normal development compared to delayed ones. Tab. 2 shows a comparison between the types of developmental disorders of children cared for at home and those entrusted to daycare. In the first evaluation, the children who were cared for at home experienced personal-social problems more frequently than those who were entrusted to daycare centres. Likewise, in the second evaluation, our study showed that personal-social disorders remained the most prevalent among other disorders. Our observations with McNemar's test were conducted to follow changes in children's development during the 6-month evaluation period (see Tab. 3). In terms of gross motor development, the number of children cared for at home improved by 26 children (28.9%); while as many as 27 children (26.2%) who were entrusted to daycare centres also experienced improvements in their developmental abilities.

In terms of speech and language development, the number of children cared for at home and entrusted in daycare experienced improvements in the development of these aspects. Tab. 3 shows that gross motor development with language and speech has a *p*-value of <0.050 ; so that it can be interpreted that a significant change in development has improved over a period of 6 months. In terms of gross motor development, changes appear more dominant in children entrusted to daycare centres (see Tab. 3). With respect to language development and speech, the change appears to be more dominant in children cared for at home. In fine motor and personal-social development, $p > 0.050$, so it can be inferred that there are no significant changes.

Tab. 4 shows the chi-square analysis of the relationship between the maternal status and changes in child development over a period of 6 months. Our observations show

Category	Parenting status		Total ^a	p
	Cared for at home	Entrusted to daycare		
	n (%)	n (%)	n (%)	
Age (months):				
• 3–12	0 (0.0)	11 (10.7)	11 (5.7)	
• 13–24	0 (0.0)	28 (27.2)	28 (14.5)	
• 25–36	2 (2.2)	19 (18.4)	21 (10.9)	
• 37–48	29 (32.2)	30 (29.1)	59 (30.6)	
• 49–60	33 (36.7)	14 (13.6)	47 (24.4)	
• 61–72	26 (28.9)	1 (1.0)	27 (14.0)	
Gender:				
• males	56 (62.2)	59 (57.3)	115 (59.6)	
• females	34 (37.8)	44 (42.7)	78 (40.4)	
Maternal employment status:				
• employed	60 (66.7)	100 (97.1)	160 (82.9)	
• unemployed	30 (33.3)	3 (2.9)	33 (17.1)	
Indonesia's PDQ results (pre-evaluation):				0.109
• normal	36 (40.0)	55 (53.4)	91 (47.2)	
• suspect	37 (41.1)	31 (30.1)	68 (35.2)	
• delayed	17 (18.9)	17 (16.5)	34 (17.6)	
Indonesia's PDQ results (post-evaluation):				0.896
• normal	64 (71.1)	74 (71.8)	138 (71.5)	
• suspect	22 (24.4)	25 (24.3)	47 (24.4)	
• delayed	4 (4.4)	4 (3.9)	8 (4.1)	
n – total sample size. p – significant differences in Indonesia's PDQ results between children who are cared for at home with those that are entrusted to daycare using Mann–Whitney <i>U</i> test. ^a The total in each category represents 193 children. [†] <i>p</i> < 0.1; * <i>p</i> < 0.05; ** <i>p</i> < 0.01; *** <i>p</i> < 0.0001.				

Tab. 1. Subjects' characteristics based on parenting status

Type of development	Parenting status		Total	p
	Cared for at home	Entrusted to daycare		
	n (%)	n (%)	n (%)	
Pre-evaluation disorders:				
• gross motor	29 (32.2)	31 (30.1)	60 (31.1)	0.871
• fine motor	20 (22.2)	30 (29.1)	50 (25.9)	0.354
• speech and language	23 (25.6)	27 (26.2)	50 (25.9)	1.000
• personal-social	48 (53.3)	40 (38.8)	88 (45.6)	0.061
Post-evaluation disorders:				
• gross motor	12 (13.3)	6 (5.8)	18 (9.3)	0.123
• fine motor	21 (23.3)	20 (20.4)	41 (21.8)	0.749
• speech and language	10 (10.0)	13 (13.6)	23 (11.9)	0.585
• personal-social	44 (44.4)	38 (38.8)	82 (41.5)	0.520
n – total sample size.				
p – significant differences in developmental disorders between children who are cared for at home and children entrusted to daycare, using the chi-square test.				
† p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.0001.				

Tab. 2. Developmental disorders according to parenting status

that children with unemployed mothers experienced 39.4% development improvement than children raised by employed mothers (37.5%). 6.2% of child development raised by employed mothers were more at risk than unemployed ones (see Tab. 4).

DISCUSSION

Based on the results of our study, children experienced the greatest developmental disorders in personal-social aspects compared to other types of development. In the study, it was also proven that the developmental disorders in children

cared for at home were far more dominant both at pre-evaluation and post-evaluation after 6 months. Increased cortisol levels in children, up to 75–100% when they are in daycare, cause the children to have a high risk of stress, so that children tend to withdraw into themselves when first in daycare. Another study shows that during the first month of children entering daycare they will begin to adapt to the new parenting environment, try to analyse the situation, and socialise by increasing peer group interactions. The constant increase in cortisol levels in children can also occur because caregivers are unable to provide adequate and equal parenting to all children in the daycare setting. Moreover, not all caregivers in daycare centres get good training on parenting, so that the parenting style provided by different caregivers in daycare centres is not the same. In the study, we found that children who were cared for in daycare had predominantly normal development. It was also observed that after 6 months of evaluation the outcomes for the development of children who were cared for at home and entrusted to daycare is the same. This happened because of the findings that we obtained when evaluating; many children cared for at home do not get care from the family or any one parent directly, but more from household assistants. It is recognised that parents like this tend to be flexible with upbringing towards their children⁽¹¹⁾. Based on developmental changes during the 6 months of evaluation, we found there were dominant changes in both parenting status on gross motor aspects and speech-language. A study explains the increasing motor skills of children aged 4–16 years have a close relationship with cognitive abilities.

Type of development	Pre-evaluation		Child's development changes after 6 months				p
	Delayed	Normal	Improved	Constant normal	Constant delayed	Decreased	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Cared for at home ^a :							
• gross motor	29 (32.2)	61 (67.8)	26 (28.9)	52 (57.8)	3 (3.3)	9 (10.0)	0.006
• fine motor	20 (22.2)	70 (77.8)	13 (14.4)	56 (62.2)	7 (7.8)	14 (15.6)	1.000
• speech and language	23 (25.6)	67 (74.4)	16 (17.8)	65 (72.2)	7 (7.8)	2 (2.2)	0.001
• personal-social	48 (53.3)	42 (46.7)	20 (22.2)	30 (33.3)	28 (31.1)	12 (13.3)	0.215
Entrusted to daycare ^b :							
• gross motor	31 (30.1)	72 (69.9)	27 (26.2)	70 (68)	4 (3.9)	2 (1.9)	0.000
• fine motor	30 (29.1)	73 (70.9)	19 (18.4)	63 (61.2)	11 (10.7)	10 (9.7)	0.136
• speech and language	27 (26.2)	76 (73.8)	20 (19.4)	69 (67)	7 (6.7)	7 (6.7)	0.019
• personal-social	40 (38.8)	63 (61.2)	15 (14.6)	48 (46.6)	25 (24.3)	15 (14.6)	1.000

n – total sample size.
p – significant differences in child development changes in nominal analysis using McNemar's test.
^a n = 90; ^b n = 103.
† p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.0001.

Tab. 3. Changes in child development based on parenting status

Maternal status	Child development changes after 6 months			p
	Improved	Constant	Decreased	
	n (%)	n (%)	n (%)	
Employed	60 (37.5)	90 (56.2)	10 (6.2)	0.336
Unemployed	13 (39.4)	20 (60.6)	0 (0.0)	

n – total sample size.
p – significance of correlation between maternal status and child development progress after 6 months' evaluation using the chi-square test.
† p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.0001.

Tab. 4. Development changes based on maternal employment status

At preschool age, physical activity in an open space affects 80% of gross cognitive and motor abilities⁽¹²⁾. Significantly, physical activity carried out for 30–40 minutes a day, at least 2 times a week, increases the levels of capable oxy-haemoglobin to maximise children's cognitive function in the brain^(11,12). This is absolutely possible because by actively engaging in physical activities children try to associate the process of memory motion and accept their own limitations/abilities (motion planning)⁽¹³⁾. The children in daycare spend more time in play groups than children cared for at home, so their social interactions also develop more rapidly. Language ability and self-regulation are known to increase when children enter the age of 3⁽¹⁴⁾. Language skills and self-regulation are proven to attain a peak at the age of 5 to 6 years, and are claimed to influence their social life in adolescence⁽¹⁵⁾.

Our findings also show that children who are cared for at home possess the potential for better development improvements, whereas in children who were entrusted to daycare the improvement tended to be constant. This finding is different from previous research which concluded that the development of children in the daycare setting was more dominantly improved than in children being cared for at home, because children who have been in daycare for a long time will rapidly adapt to problems in their surroundings and feel comfortable with the care environment without their parents⁽¹¹⁾. In the research we conducted, it was found that the status of working mothers having children with normal

development categories was more dominant. However, from what we discovered in the study, children of non-working mothers had the potential to improve significantly by 39.4% compared to working mothers. This is because mothers who do not work have more time to interact with their children, so that the direct stimulation effects equally affect the child's development⁽²⁾. The mothers who work professionally have a higher level of education, which makes it easier for them to find information about child development, and hence provide appropriate support for their child's growth and development⁽⁹⁾. Other studies found that maternal education levels significantly affected their children's development; the higher the mother's education, the greater the risk of the child growing up with development abnormalities. This is because highly educated mothers are typically career women, and hence their interactions with their children become reduced because of their difficulty setting aside free time for this purpose⁽⁶⁾. In our study, it was also observed that working mothers had a risk of children who deteriorated 6.2% higher than mothers who did not work. In fact, not all parents receive good knowledge in parenting⁽¹⁶⁾, and the development of their children reported a more significant increase in mothers who did not work. The study shows that most parents carry out parenting duties based solely on their life experience, personal opinions and expectations of their children's personal character which are obtained from the communication media used by the mothers⁽¹⁷⁾. According to previous research, parents who do not entrust their children to daycare are stigmatised; spending a long time playing with lots of children causes their child to get tired and easily stressed, so that practically the parents nonetheless provide independent care at home⁽¹⁸⁾. Various results are published in similar studies which illustrate differences in the development of children who receive their care under different conditions by family and professional caregivers. This is because the development of men tends to be abnormal in 21% of cases, compared to only 12% in women. This theory is based on male endurance when children are more susceptible to illness than women, though this research has been undetailed yet⁽¹⁹⁾.

Nevertheless, several limitations of this study need to be addressed. Other variables, such as parenting style, need to be considered in relation to the child's development with altered parenting status. Secondly, socioeconomic aspects and peer attachment of children with parents also need to be analysed further so as to reduce the bias.

CONCLUSIONS

In conclusion, parents' knowledge about parenting and child development is critically important especially during the first 1,000 days of life and at preschool age, regardless of the parents' educational background and economic status. In preschool children, there is a significant change over a period of 6 months in gross motor aspects and speech-language skills, but personal-social aspects present a major problem in child development. Today, the trend of working mothers is growing, so the interaction between mothers and children decreases. This increases the risk of barriers hindering child development, but this risk can be reduced, while providing optimal care, both at home and in the daycare setting. Optimal care can be achieved by conducting screening and evaluation at each stage of child development. For this reason, the use of Indonesia's PDQ as a screening and evaluation tool for child development needs to be improved in all primary healthcare facilities and by family physicians.

Conflict of interest

The authors have no conflicts of interest associated with the material presented in this paper.

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