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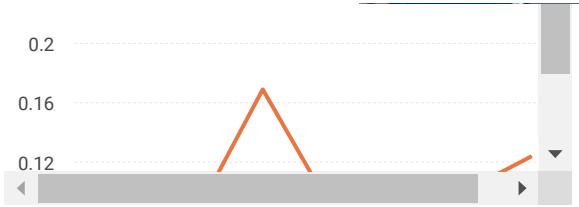

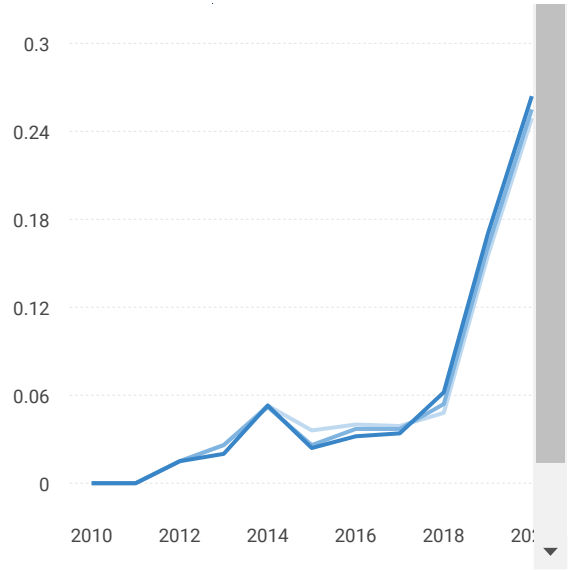

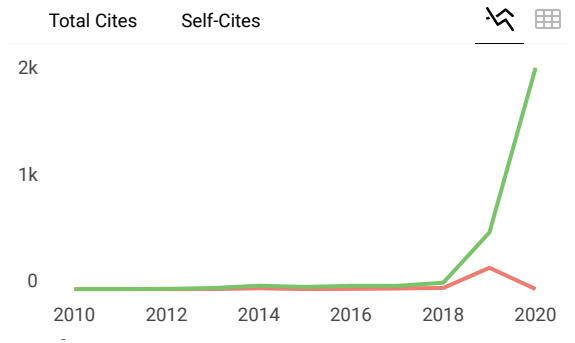

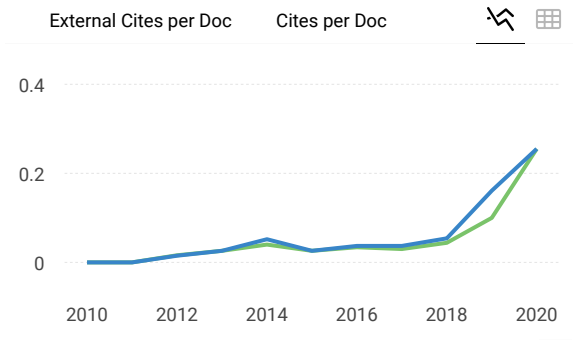

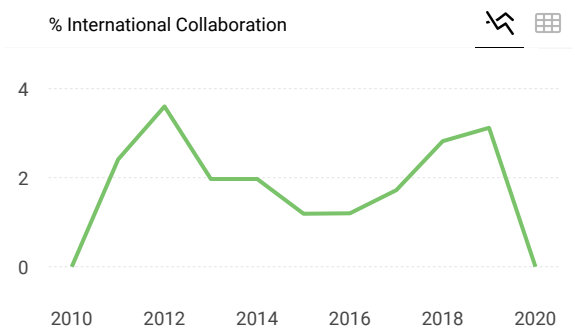

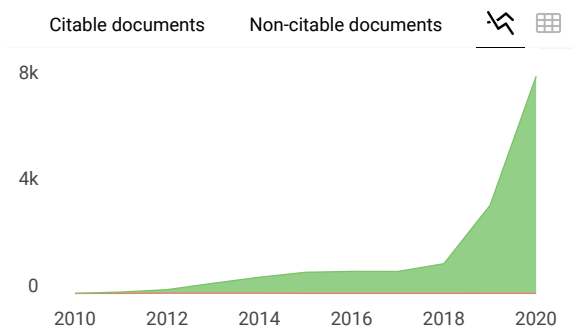

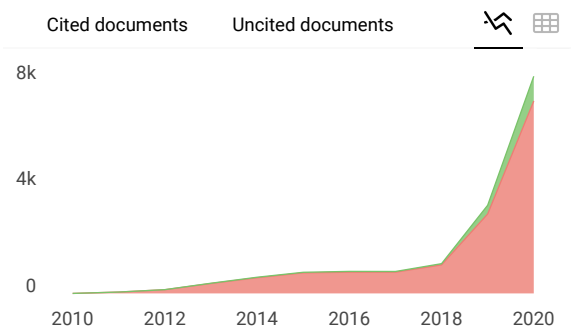

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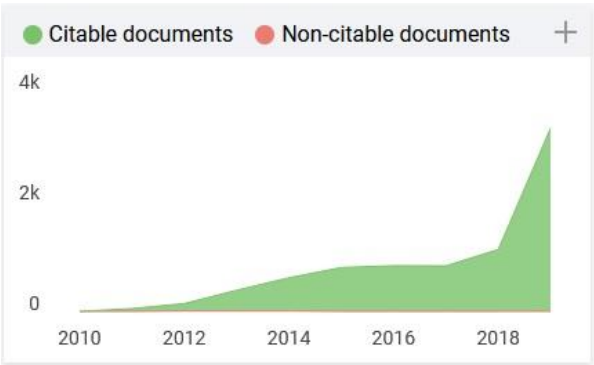

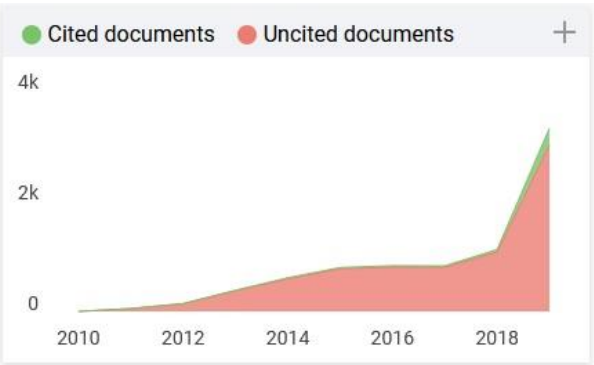

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Comparison of Child Development between Aterm and Premature Birth at Age 2-3 Years Old in Kabupaten Probolinggo, Indonesia

Innas Tiara Ardhiani[1], Ahmad Suryawan[2], Martono Tri Utomo[3]

[1]Department of Reproductive Health Science, Faculty of Medicine, Airlangga University, [2]Department of Child Health, Faculty of Medicine, Airlangga University and General Hospital Dr. Soetomo, [3]Department of Child Health, Faculty of Medicine, Airlangga University and General Hospital Dr. Soetomo

Abstract

Cases of preterm birth are still a problem in developing countries. WHO data in 2013 shows the rate of preterm birth in Indonesia at 2010 was 15.5% of total births. The prevalence of preterm birth in Kabupaten Probolinggo tends to increase from 2011 to 2013. Premature births are at risk of developing language delays, motor balance and coordination. This study aims to analyze developmental differences in children with a history of premature birth and term. The data used was primary data through filling questionnaires and interviews to subjects. This study was observational analytic with retrospective cohort design. The population was all 2-3 years old children at Kabupaten Probolinggo. Sampling was using a simple sampling formula and obtained 100 children into 2 groups. First group was 50 children who aterm at birth. Second group was 50 children who premature at birth. The result showed that there were there is significant differentat child development between aterm and premature born childen ($p<0.05$). The relativerisk (RR) analysis showed that the value is significant enough. Children development was influenced by type of born (RR=1.647x).

Keywords: *Children development, premature birth, development disorder.*

Introduction

Premature birth is defined by the estimated gestational age as a measure of maturity. Three subgroups were distinguished by the World Health Organization (WHO): premature pregnancy (<37 weeks), very premature (<32 weeks), and very premature (<28 weeks)[1].

More than 60% of premature births occur in Africa and South Asia, but preterm birth is truly a global problem. In low-income countries, on average, 12% of babies are born too early compared to 9% in high-income countries[2].

WHO data shows in 2013 there are 15.5 per 100 live births or as many as 675.700 people were born prematurely[3]. In the Probolinggo Public Health Office report in 2015 there were 992 babies (5.36%) who suffered from premature birth and Low Birth Weight (LBW), this number increased from 2014 which totaled 956 infants[4].

Progress of neonatology in recent decades has significantly reduced mortality and morbidity of high-risk infants[5]. However, premature babies have a higher risk ofdecreasing levels of physical growth, delays in language development, motor balance, coordination and developmental deficits when compared to children born with childbirth[6].

Increasing and decreasing GM (gray matter) and WM (white matter) volumes have been described in young adults with very pre-term (VPT)/very low birt weight (VLBW), especially in the internal capsule, insula, prefrontal cortex, medial gyrus/parahippocampalgyrus and putamen[7]. This volume growth is mainly due to the growth of new neurons and synapses[8].

Correspondence:
Innas Tiara Ardhiani
Department of Reproductive Health Science, Faculty of Medicine, Airlangga University
e-mail: inezt12@hotmail.com

Significant 'wiring' occurs during the first years of a child's life and this effectively programs child development. At three, a child has around 1000 trillion brain connections or synapses, which in later development are selectively pruned.It is the experiences and relationships that infants and young children have that continuously develop their brains and build the neural circuits that will be the foundation for later development[9]. A child's experience plays a large role in determining which surplus connections are gradually eliminated during childhood and adolescence, a process sometimes called pruning[8].

In the neonatal period, the development of premature infants shows that they are distinctively different compared to infants in relation to autonomic responses, motor responses, behavioral conditions, attention/ interaction and self-regulation systems[5].Among the problems found in the neonatal period, brain damage, especially periventricular hemorrhage, is prominent, namely abnormalities that most commonly affect the central nervous system(CNS) of premature infants[10]. They may also experience respiratory complications such as chronic lung disease, which can jeopardize the functioning of the CNS, increase the occurrence of neurological sequelae and, as a result, learning difficulties during school[11].

Cheong et al. noted that the percentage of children with microcephaly increased from 2 years of age, which indicates a failure of postpartum brain growth[12]. A recent study also found that children with small heads consistently during the first 2 years of life were seven times more likely to experience neurocognitive disorders[13].

Child development is a dynamic process whereby children develop from dependence on caregivers in all areas that function during growth, towards growing independence in childhood (primary school age), adolescence and adulthood. Skills appear in a number of related domains: motor, cognitive, communication and social-emotional sensory[14].

In the neonatal period, the development of premature infants shows that they differ significantly compared to infants in relation to autonomic responses, motor responses, behavioral, attention/interaction and self-regulation systems[15]. This is influenced by a variety of biological and environmental factors, some of which protect and enhance their development while others compromise the results of their development[14].

Whereas the first years of life, especially the period from the fetus in the womb to a 2-year-old child are a very important period of child growth and development. This period is a golden opportunity as well as a period that is vulnerable to negative influences. Childhood is an important phase in growth and development because the experience during childhood can affect the outcome of one's life[14,15].

However, it has never been compared directly whether there is a significant difference between children born with a history of premature and aterm born at the age of golden age of growth (2-3 years old).

Materials and Method

This study was observational analytic with retrospective cohort design. The population was all 2-3 years old children at Kabupaten Probolinggo.

Sampling was using a simple sampling formula and obtained 100 children then divided into 2 groups. First group was 50 children who aterm at birth. Second group was 50 children who premature at birth. Inclusion criteria of this study were : The child age was ≥ 2 and <4 years old at April 2018, healthy, past gestational age 37-40 weeks and <37 weeks (for premature group).

This study used primary data through doing children development test from Indonesia Ministry of Health (KPSP) to subjects. The test tool and equipment were provided by researcher. Examiners are certified by Kabupaten Probolinggo Public Health Office.

The The independent variables were child at 2-3 years old age with aterm and premature born. The dependent variable was child developmental, wich is normal or there are developmental disorder. SPSS Statistics 22.0 was used for data analysis. Bivariate analysis were compared using cross-tabulations and Chi-Square Test with $p = 0.05$.

Findings

Table 1: Bivariate analysis between type of birth and child development

Variable	Aterm		Premature		Total		p value (Sig)	RR	95% CI
	n	%	n	%	N	%			
Child Development									
Normal	33	33	22	22	55	55	0,027	1,647	1,042-2,603
Possibility of Disorder	19	19	26	26	45	45			

*Significantly different using Chi-Square Test (p > 0.05)

Based on the **Table 1** above, it can be seen that the results of chi-square statistical tests indicate that the results of the calculation of p value is 0.027, which means the value (p< 0.05). This means that there is significant difference in the development of premature or aterm born children.

The RR results indicate that children born prematurely have a chance of 1.647x to be affected by growth disorders. RR value is, because the value of RR where the sample is taken is 1,042-2,603 (RR>1) which means the risk of developing developmental disorders inchildren born with premature is 1,042 to 2,603 times.

Discussion

On the KPSP test (Pre Development Screening Questionnaire) which is a series of tests from SDIDTK (Early Stimulation, Detection and Intervention of Child Development) can be found aspects of development, gross motor movement, fine motor, speech and language, and socialization and independence.

During the development test, there are several development points that the KPSP test results indicate failure. As many as 70% of premature children showed that they still did not fulfill 2 aspects, namely the aspects of speech and language, as well as aspects of socialization and independence.

Premature birth coincides with a higher level of problem with language function compared to children born at term[16]. In a meta-analysis by van Noort-van der Speket al. revealed that premature children received significantly lower scores compared to children born at a simple age, as well as in complex language function tests, during childhood, even without major disabilities and independent of SES (socio-economic status)[17].

Premature born or low birth weight children show lower performance in functional capacity and independence compared to children without these characteristics, but environmental and socioeconomic conditions appear to have a significant effect on the results found[18,19].

What happens before birth and within a few years of life plays an important role in health and social outcomes. While genetic factors play a role in shaping child development, evidence shows that the environment has a major influence during childhood[14].Australian Early Development Census said that key features of early brain development can be fostered by relationships with caregivers, and can be supported by optimal community environments for families and children. Brain development is also vulnerable to toxic stress (depending on length and number of stressors for the child)[9].Therefore children with a history of premature birth need special guidance and stimulation from parents and those around them during the development period so that they can experience optimal childhood.

Ministry of Health suggests that growth and development in the early stages determine the next development. The developmental stage of a child follows regular and sequential patterns. These stages cannot occur upside down, for example the child is first able to make a circle before being able to draw a box, the child is able to stand before walking and so on[15].

According to the Ministry of Health about the stages of development and stimulation aged 24-36 months, in the speech and language column, the child should be able to: talk well using 2 words. Can appoint 1 or more parts of his body when asked. See images and can correctly call the names of 2 or more objects. Help pick up their own toys or help lift plates if requested[15].

But what the researchers found in the field, children had difficulty communicating, still could not construct the word correctly and had not been able to speak by

forming 2 words well according to age level. While the other points, most of them have been able to carry out activities according to their age.

Toddler growth and development will be optimal if the environment provides positive support or vice versa[20]. Environmental factors are factors that determine whether or not an innate potential is made up of a bio-psycho-social environment[21]. We suggest that children who are still unable to communicate can be stimulated by development, for example: read storybooks before going to sleep, encourage children to want to tell stories and talk more, use good language and not slur when talking to children.

Socio-emotional functioning involves the ability to learn to successfully interact and communicate within a social context and to efficiently deal with emotions, deficits in multisensory processing may affect speech perception, subsequently resulting in difficulties in communication and social interactions[22,23].While in the socialization and independence column, the Ministry of Health also stated that children should be able to eat their own rice without spilling and removing their own clothes[15]. In the field, we have found that children cannot eat on their own, if the child can eat alone, their food tends to spill out of its place.

Most children also still cannot take off their own clothes, but some children can just take off their pants. We recommend that children be given more stimulation to stimulate socialization and independence aspect, for example: teach children to dress themselves without help, give children the opportunity to choose the clothes they will wear. Encourage children to clean their bodies when dirty and then wipe them with as little help as possibleand do light housework.

Conclusion

The development of 2-3 years old children is very important because it is the gold age for the growth and development period, especially children with a history of premature birth who have a risk of developmental disorders. Parents should give more attention in providing appropriate developmental stimulation according to the child's age.

Conflict of Interest: There was no conflict of interest in this study.

Ethical Clearance: This study was received ethical approval from the Health Research Ethics Committee, Faculty Medicine, Airlangga University.

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References

1. WHO. Preterm Birth. Fact Sheet. 2017.http://www.who.int/mediacentre/factsheets/fs363/en/(cited Feb 4, 2018)
2. Blencowe H, Cousens S, Oestergaard M, Chou D, Moller AB,.. . Lawn JE. National, regional and worldwide estimates of preterm birth. The Lancet. 2012;379(9832):2162-72.
3. WHO. (2018, February 19). Preterm birth.http://www.who.int/news-room/fact-sheets/detail/preterm-birth (cited June 4, 2018)
4. Dinas Kesehatan Kabupaten Probolinggo. Profil Kesehatan Kabupaten Probolinggo Tahun 2015. http://dinkes.probolinggokab.go.id/dokumen/profilkesehatan/PROFIL_KESEHATAN_KAB_PROBOLINGGO_2015.pdf (cited June 12, 2018)
5. Formig CKMR &Linhares MBM. Assessment of preterm children's early development. Rev Esc Enferm USP. 2009;43(2):469-76
6. Campbell SK. The infant at risk for developmental disability. In: Campbell, S.K. Decision making in pediatric physical therapy. New-York: Churchill Livingstone. 1999;260-332.
7. Allin M, Matsumoto H, Santhouse AM, Nosarti C, Al-AsadyMHS, Stewart AL, et al. Cognitive and motor function and the size of the cerebellumin adolescents born very pre-term. Brain. 2001; 124(1):60–66.
8. Huttenlocher PR. Perspectives in cognitive neuroscience. Neural plasticity: The effects of environment on the development of the cerebral cortex. Cambridge, MA, US: Harvard University Press;2002.
9. Autralian Early Development Concensus. AEDC : Brain development in children. 2014. www.aedc.gov.au. (cited Feb 10, 2018)
10. O'Shea TM, Counsell SJ, Bartels DB, & Dammann O. Magnetic resonance and ultrasound brain imaging on preterm infants. Early Hum Dev. 2005;81(2):263-71.

11. Hagberg H & Jacobsson B. Brain injury in preterm infants: what can the obstetrician do? Early Hum Dev. 2005;81(3):231-5.
12. Cheong JLY, Hunt RW, Anderson PJ, Howard K, Thompson DK, Wang HX.. . Doyle LW. Head growth in preterm infants: Correlation with magnetic resonance imaging and neurodevelopmental outcome. Pediatrics2008; 121(1)534–40.
13. Wright CM & Emond A. Head growth and neurocognitive outcomes. Pediatrics. 2015;135(1)393–8.
14. WHO. Early childhood development and disability: discussion paper.Malta : WHO Library Cataloguing-in-Publication Data;2012.
15. Kementrian Kesehatan Republik Indonesia. Pedoman Pelaksanaan Stimulasi, Deteksi, dan Intervensi Dini Tumbuh Kembang Anak ditingkat Pelayanan Kesehatan Dasar. Jakarta : Departemen Kesehatan RI; 2016 : 51-52.
16. van Noort-van der Spek IL, Franken MC, Wieringa MH & Weisglas-Kuperus N. Phono-logical development in very-low-birthweight children: an exploratory study. Dev Med Child Neuro. 2010;52(6):541–546.
17. van Noort-van der Spek IL, Franken MC, & Weisglas-Kuperus N. Language Functions in Preterm-Born Children : A Systematic Review and Meta-analysis. Pediatrics.2012;129:E4751-2.
18. Lemos RA, Frônio JS, Ribeiro LC, Demarchi RS, Silva J, Neves LAT.Functional performance according to gestational age and Birth weight of preschool children born premature or with low weight. J Hum Growth Dev.2012;22(1):17-26.
19. Pilz EML & Schermann LB. Determinantesbiológicos e ambientais no desenvolvimentoneuropsicomotoremumaamostra de crianças de Canoas/RS. CiencSaude Colet. 2007;12(1):181-90
20. Soedjatmiko. Deteksi Dini Gangguan Tumbuh Kembang Balita. Sari Pediatri Vol. 3, No.3. 2001:175-188.
21. Soetjiningsih. Tumbuh Kembang Anak. Jakarta: EGC; 1995.
22. Iarocci G, Yager J, Elfers T. What gene-environment interactions can tell us about social competence in typical and atypical populations.Brain Cogn.2007; 65:112–127.
23. Wickremasinghe AC, Rogers EE, Johnson BC, Shen A, Barkovich AJ, Marco EJ. Children born prematurely have atypical sensory profiles. J. Perinatol.2013; 33:631–635.