

# Pattern of children diseases : A hospital BPJS claim based study

**Cicah Opitasaki, Sri Laning Dryah**

Research and Development Center for Health Resources and Services, National Institute of Health Research and Development, Ministry of Health, Jakarta, Indonesia

Corresponding address: Cicah Opitasaki

Email: vitasaki2010@gmail.com

**Abstract.** The children are vulnerable to get many diseases caused by viruses, bacteria, fungi and parasites although the innate or adaptive immune systems begin to mature. This study aims to assess the pattern of diseases in children hospitalized with BPJS Kesehatan. This observational study was conducted on purposively selected samples in one type A hospital in Jakarta. The data were obtained from all claim data of BPJS patients who admitted into the hospital ward between the period of January to December 2017. The patients in the pediatric age group (below 18 years) were included in the analysis descriptively. There were a total of 3689 pediatric patients with BPJS insurance presented into hospital wards. Of which, 995 were readmission, resulting in 4684 admissions within the one-year period. The male to female ratio of 1.4:1, with mean (SD) age was 4.8 (5.8) years. The most frequent child admitted was infants (42.2%). Certain conditions originating in the perinatal period system category was the leading cause of admissions (P00-P96). The fetus and newborn affected by Caesarean delivery (P03.4) and bacterial sepsis of newborn, unspecified (P36.9) as the common cause of those category. The overall mortality rate was 7,3% with the majority cause of death was also certain conditions originating in the perinatal period accounted for 33.6%. Meanwhile diseases of the circulatory system had greatest CFR as many as 22.6%. Conclusion: Infants age had high morbidity and mortality due to condition originating in the perinatal period.

Keyword: pattern, diseases, children, BPJS

## 1. Introduction

The children are vulnerable to get many diseases caused by viruses, bacteria, fungi and parasites although the innate or adaptive immune systems begin to mature.(1) Information of disease pattern is necessary to improve health care quality as well as to set the health policy priorities. (2)(3)

Globally, the majority of burden diseases (DALYs) occur in children younger than five years, with the main cause of disability was lower respiratory infections. Preterm birth complications and neonatal encephalopathy increase in rank due to their relatively slower rates of decline than diarrhea. Furthermore, iron deficiency anemia is still the major cause of disability among older children and adolescents in both 1990 and 2013.(4)

According to maternal child health profile in 2018 , child morbidity rate in Indonesia was 15.86 percent. (5) The burden diseases for children aged 0-4 years old is related to birth process and complication while children aged 5-14 is related to skin diseases, non communicable diseases such as diarrhea and traffic accidents.(6) Within the past 1 year, 3 out of 100 children have been hospitalized and more than half use the health insurance.(7) At the start of 2014, Indonesian government launched the National Health Insurance system (Jaminan Kesehatan Nasional hereafter referred to as JKN). This insurance is under Social Security Administrative Body (Badan Penyelenggara Jaminan Sosial / BPJS Kesehatan). The two types of health insurance most commonly used by children in Indonesia are BPJS Kesehatan PBI /contribution assistance recipients (20,37 %) and non PBI(20,08 %). (5) This study aims to assess the pattern of diseases in children who are hospitalized with BPJS Kesehatan.

## 2. Method

This observational study was conducted on purposively selected samples in one government hospital in Jakarta. The data were obtained from all claim data of BPJS patients who admitted into the hospital ward between the period of January to December 2017. The patients in the pediatric age group (below 18 years) were included in the analysis.

The data collected were: age, sex, , number of admission, number of patients, monthly distribution of admissions, diseases groups, number of inpatient hospital death, and case fatality rate. Age was categorized into four groups referring to regulation of the minister of health number 25 year 2014 on child health efforts : infants (below 1 year), under five (1- below 5 years), preschool (5-6 years), school age (> 6 years to < 18 years).(8) Age was also presented as a mean  $\pm$  SD. Sex was divided into two groups : male and female as well as presented in male to female ratio. Diseases groups was classified according to ICD 10 Category (2010).(9) There were 20 categories of ICD 10 identified for the children diseases in this study. Case fatality rate was defined as the ratio of child death due to a particular disease to the total number of cases due to the same diseases. (10)

Descriptive statistics was used to analyze the data obtained by using SPSS version 16 for Windows. Ethical approval was obtained from Ethics Committee, Faculty of Public Health, University of Indonesia with letter number: 564/UN2.F10/PPM.00.02/2017.

## 3. Result and Discussion

There were a total of 3689 pediatric patients with BPJS insurance presented into hospital wards. Of which, 995 were readmission, resulting in 4684 admissions within the one-year period. As shown in the table 1, these children consist of 58.2% males and 41.8% females, giving a male to female ratio of 1.4:1. The mean (SD) age was 4.8 (5.8) years, with the most frequent patients was infants (42.2%), followed by children at school age groups (31.6%), under five age (20.0%) and the lowest was preschool age (6.2%).

Table 1. Demographic characteristic of hospitalized children with BPJS Kesehatan

Variables	Number of admission		Number of patients	
	n (4684)	%	n (3689)	%
<b>Sex</b>				
Male	2745	58.6	2146	58.2
Female	1939	41.4	1543	41.8
<b>Age groups (Years)</b>				
Infant	1733	37.0	1557	42.2
Under Five	1013	21.6	736	20.0
Pre school	337	7.2	230	6.2
School	1601	34.2	1166	31.6
Male : Female ratio	1.4 : 1			
Mean age (years) $\pm$ SD	4.8 $\pm$ 5.8			

Similarly with this study, Chinawa et al reported that the majority of patients were male patients and the age were 0 – 12 months.(11) Other study by Tyagi et al also found male to female ratio was 1.54:1.(12) In many ways, male are more vulnerable than female. This is probably due to biological fragility in male fetuses, which is still poorly understood and not widely known. The risk of death or

damage from the obstetric catastrophes was higher for male fetus that can occur before birth. A newborn girl has a psychological equivalent to a boy aged 4 to 6 weeks.(13) Infants are one of the most vulnerable groups of children to get illness. Overall, the innate immune system is turned off at birth, this happen to tolerate the non shared mother's antigens as well as to ignore the amount of stress and remodeling that occurs during development. (1)

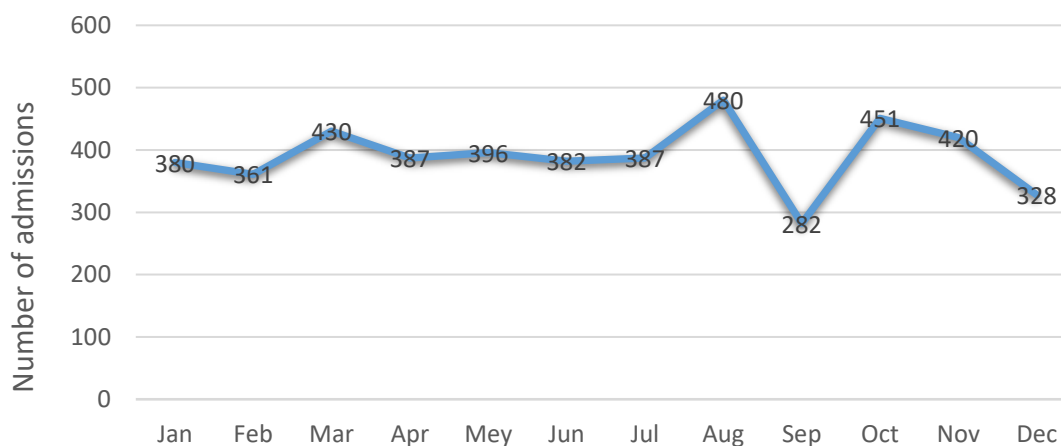


Figure 1. Monthly distribution of admissions

The graph on the figure 1 presents monthly distribution of admitted cases during the one-year period. Generally, there was a near equal number of pediatric patients with BPJS insurance who are hospitalized at the hospital every month. The mean of admissions was 390 with the highest admissions reached 480 on August and the lowest were 282 admissions on September. Indonesia is a tropical country that only has two seasons : the rainy season and dry season. In general, the rainy season in Indonesia occurs from March to October and the dry season occurs from April to September.(14) In this regards, the season seems to has no impact to the number of cases admitted.

Table 2. Frequency of ICD 10 category for admissions by age groups

ICD 10 Category	Infant	Under Five	Pre school	School	Total	
	n	n	n	n	n	%
Certain infectious and parasitic diseases	71	124	26	104	325	6.9
Neoplasms	10	34	12	73	129	2.8
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	20	36	22	118	196	4.2
Endocrine, nutritional and metabolic diseases	11	9	5	25	50	1.1
Mental and behavioral disorders	0	1	0	0	1	0.0
Diseases of the nervous system	17	26	12	39	94	2.0
Diseases of the nervous system	1	6	0	10	17	0.4
Diseases of the ear and mastoid process	0	10	3	26	39	0.8
Diseases of the circulatory system	10	5	0	30	45	1.0
Diseases of the respiratory system	96	87	19	61	263	5.6
Diseases of the digestive system	54	68	30	129	281	6.0
Diseases of the skin and subcutaneous tissue	4	7	1	23	35	0.7
Diseases of the musculoskeletal system and connective tissue	1	25	13	126	165	3.5
Diseases of the genitourinary system	22	57	17	107	203	4.3
Pregnancy, childbirth and the puerperium	0	0	0	47	47	1.0
Certain conditions originating in the perinatal period	1055	2	0	0	1057	22.6

Congenital malformations, deformations and chromosomal abnormalities	197	154	33	99	483	10.3
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	39	93	22	41	195	4.2
Injury, poisoning and certain other consequences of external causes	14	60	17	178	269	5.7
Factors influencing health status and contact with health services	111	209	105	365	790	16.9

Table 2. illustrates the frequency of diagnosis based on ICD 10 category by age groups. There were twenty ICD 10 categories identified in these study. Out of 4684 cases admitted to the ward, certain conditions originating in the perinatal period system group (P00-P96) which happen to the infant age was the leading cause of admissions (22,6%). The fetus and newborn affected by Caesarean delivery (P03.4) and bacterial sepsis of newborn, unspecified (P36.9) as the common cause of those category. The second greatest category was factors influencing health status and contact with health services (Z00-Z99) which occur to children under five, preschool and school age groups. The majority of this category was observation for other suspected diseases and conditions (Z03.8), followed by observation for suspected malignant neoplasm (Z03.1).

The study done by Tyagi in a new tertiary care hospital in India also found a problem in live born infants as one of the major causes of the admission.(12) Meanwhile Ezeonwu et al and Chinawa et al reported in their study in Nigeria that the common indication for admission was malaria.(15)(11) The difference may be due to Nigeria indeed was one of the malaria endemic countries. According to world malaria report by WHO in 2018, Malaria cases in Nigeria accounted for nearly half of all malaria cases worldwide.(16)

Tabel 3. Frequency of ICD 10 Category in relation with case fatality rate

ICD 10 Category	Number of patients		Number of inpatient death		Case Fatality Rate
	n	%	n	%	%
Certain infectious and parasitic diseases	254	6.9	17	6.3	6.7
Neoplasms	86	2.3	9	3.3	10.5
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	70	1.9	4	1.5	5.7
Endocrine, nutritional and metabolic diseases	36	1	0	0.0	0.0
Mental and behavioural disorders	1	0	0	0.0	0.0
Diseases of the nervous system	72	2	8	3.0	11.1
Diseases of the nervous system	17	0.5	0	0.0	0.0
Diseases of the ear and mastoid process	34	0.9	0	0.0	0.0
Diseases of the circulatory system	31	0.8	7	2.6	22.6
Diseases of the respiratory system	215	5.8	34	12.5	15.8
Diseases of the digestive system	246	6.7	4	1.5	1.6
Diseases of the skin and subcutaneous tissue	29	0.8	0	0.0	0.0
Diseases of the musculoskeletal system and connective tissue	134	3.6	2	0.7	1.5
Diseases of the genitourinary system	121	3.3	3	1.1	2.5
Pregnancy, childbirth and the puerperium	43	1.2	0	0.0	0.0
Certain conditions originating in the perinatal period	1033	28	91	33.6	8.8
Congenital malformations, deformations and chromosomal abnormalities	385	10.4	24	8.9	6.2

Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	163	4.4	4	1.5	2.5
Injury, poisoning and certain other consequences of external causes	250	6.8	9	3.3	3.6
Factors influencing health status and contact with health services	469	12.7	55	20.3	11.7
<b>Total</b>	<b>3689</b>		<b>271</b>		

Table 3. describes frequency of ICD 10 category in relation with case fatality rate (CFR). The overall mortality rate was 7,3% (271/3689), with the majority cause of death was certain conditions originating in the perinatal period accounted for 33.6%. Bacterial sepsis of newborn, unspecified (P36.9) was the main cause of death in the category. In term of CFR, Five diseases categories with greatest CFR were diseases of the circulatory system as many as 22.6%, followed by diseases of the respiratory system 15.8%, factors influencing health status and contact with health services 11.7%, diseases of the nervous system and neoplasm with percentage 11.1% and 10.5% respectively.

This finding is consistent with previous study in England and Wales. Sidebotham found that the highest rates of child deaths from 1990 to 2011 are in infancy. The predominant causes were Perinatal and congenital problems.(17) In Indonesia, Rachmawati et al reported most of the infant death caused by low birth weight in urban area, and digestive diseases in rural area.(18) The reason for the differences may be due to the data source of this study is hospital based while Rachmawati et al is community based study by using basic health research 2007.

#### 4. Conclusion

Infants age had high morbidity and mortality due to condition originating in the perinatal period. Therefore, provide adequate infrastructure and improve capacity of human resources and is necessary to maintain sustainability and quality maternal and neonatal services. Timely referrals with appropriate supportive care are also important by training midwives at the primary level.

#### References

- [1] Simon AK, Hollander GA, Mcmichael A, Mcmichael A. Evolution of the immune system in humans from infancy to old age. *Proc R Soc.* 2015;B 282: 201:1–9.
- [2] Kløvggaard M, Nielsen NO, Sørensen TL, Bjerregaard P, Olsen B, Christesen HT. Children in Greenland: disease patterns and contacts to the health care system. 2016;1:1–10.
- [3] Anunnatsiri S, Reungjui S, Thavornpitak Y, Pukdeesamai P, Mairiang P. Disease Patterns among Thai Adult Population : An Analysis of Data from the Hospitalization National Health Insurance System 2010. *J Med Assoc Thai.* 2012;95:74–80.
- [4] Global Burden of Disease Pediatrics Collaboration, Kyu H, Pinho C, Al. E. Global and national burden of diseases and injuries among children and adolescents between 1990 and 2013 : findings from the Global Burden of Disease 2013 Study. *JAMA Pediatr.* 2016;170(3):267–87.
- [5] Kementerian Pemberdayaan Perempuan dan Perlindungan Anak, Badan Pusat Statistik. *Profil anak Indonesia 2018.* Jakarta; 2018.
- [6] Bappenas. *The Consolidated Report on Indonesia Health Sector Review 2018.* Jakarta; 2018.
- [7] Badan Pusat Statistik. *profil kesehatan ibu dan anak 2018.* Jakarta; 2018.
- [8] Kementerian Kesehatan Republik Indonesia. *Regulation of minister of health number 25 year 2014 on child health effort.* 2014.
- [9] World Helath Organization. *International Statistical Classification of Diseases and Related Health Problems 10th revision.* Vol. 2. 2010.

- [10] Payne-James J, RW B. Encyclopedia of Forensic & Legal Medicine (2nd Edition). Encyclopedia of Forensic and Legal Medicine: Second Edition. 2015.
- [11] Chinawa J, Aniwada E, Eze J, Ndu IK. Pattern and prevalence of common pediatric illnesses presenting in a private hospital in Onitsha, south east Nigeria : A comparative analysis . *Curr Pediatr Res*. 2018;22(1):88–94.
- [12] Tyagi BB, Mohanti BK, Hazarika N, Raina V, Registry M-C, Consultant S. An epidemiological study on morbidity patterns amongst hospitalized children in a new tertiary care hospital of Gurgaon , India. *Int J Med Heal Res*. 2016;2(11):6–14.
- [13] Kraemer S. The fragile male. *BMJ Clin Res*. 2000;321(7276):1609–12.
- [14] Rahayu ND, Sasmito B, Bashit N. Analisis pengaruh fenomena Indian Ocean Dipole (IOD) terhadap curah hujan di pulau Jawa. *J Geod Undip*. 2018;7(1):57–67.
- [15] Ezeonwu BU, Chima OU, Oguonu T, Ikefuna AN, Nwafor I. Morbidity and Mortality Pattern of Childhood Illnesses Seen at the Children Emergency Unit of Federal Medical Center , Asaba , Nigeria. *Ann Med Heal Sci Res*. 2014;4(3):239–44.
- [16] WHO. World malaria report 2018 [Internet]. Geneva; 2018. Available from: <https://apps.who.int/iris/bitstream/handle/10665/275867/9789241565653-eng.pdf?ua=1>
- [17] Sidebotham P, Fraser J, Fleming P, Ward-platt M, Hain R. Child death in high-income countries 2 Patterns of child death in England and Wales. *Lancet* [Internet]. 2014;384(9946):904–14. Available from: [http://dx.doi.org/10.1016/S0140-6736\(13\)61090-9](http://dx.doi.org/10.1016/S0140-6736(13)61090-9)
- [18] Rachmawati T, Turniani L, N HB. Pola Penyakit Penyebab Kematian Bayi di Pedesaan dan Perkotaan , Kondisi Sosio Ekonomi pada Kejadian Kematian Bayi di Indonesia Hasil Riskesdas 2007. *Bul Penelit Sist Kesehat*. 2007;14(2):108–14.