



Medications, Healthcare Workers and Laboratory Capabilities to Manage HIV Infection among Children from 10 Districts of Indonesia

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To identify the availability of Medications, Healthcare Workers and Laboratory Capabilities to manage HIV infection among children from 10 Districts of Indonesia to inform efforts to improve healthcare.

Study Design: Cross-sectional study.

Place and Duration of Study: Five provinces with the greatest number of People Living With HIV/AIDS (PLWHA) in Indonesia: Jakarta, East Java, Bali, Papua and North Sumatera, between May and July 2015.

Methodology: Study subjects were parents/caregivers of children living with HIV/AIDS (CLWHA). The number of subjects was calculated by estimating a population proportion with absolute precision, excluding those that cannot communicate well and of CLWHA who lived independently. 267 respondents were taken proportionately from each district. This descriptive study was conducted by using pre-test questionnaires and checklists to observe the availability of ARV and OI medication, medical devices and laboratory reagents.

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Results: Data of 239 parents/caregivers out of 267 can be analyzed concerning their perception of the availability of ARVs and laboratory equipment. They are primarily their own parents (65.7%), more than half up to junior high school graduate (52.7%). The availability of medications at some hospitals are limited or unavailable. Nurses are still lacking and many who have not been trained. The comprehensiveness of the laboratory equipment and capabilities is still insufficient. The viral loads can only be examined in one hospital and CD4 cannot be counted in several hospitals. The availability of reagents is also very limited. There is no relation between respondents' perception of the availability of ARVs and of the completeness of laboratory equipment with their education level ($p>0.05$).

Conclusion: The availability of medications for HIV/AIDS must be assured and the number of trained nurses still need to be increased.

Keywords: Children; anti retro viral; health workers; laboratory; HIV infection; Indonesia.

1. INTRODUCTION

In Indonesia, each 25 minutes there is one person recently infected with Human Immunodeficiency Virus (HIV). One out of every five persons infected aged under 25 years. Without the acceleration of HIV-tackling program, more than half a million people in Indonesia was HIV positive during 2014. The Ministry of Health of Indonesia is projecting an increase in infections in children due to the increasing new HIV infections in women [1]. The Directorate General of Disease Control and Environmental Health [2] reported that the number of HIV infections at age under 14 years old in 2010-2013 was 3,080 (3.64%), and at age between 15 and 19 years old was 2,908 (3.44%). It is estimated that only 76.7% children aged under 14 years old received Antiretroviral (ARV). Efforts to suppress HIV transmission to child is already done by means of the Program on Prevention of Mother to Child Transmission (PMTCT), but the results are still not optimal. Most pregnant women with positive HIV test results do not come back to health facilities to get further ARV therapy. This may be due to the fear of stigma and to preserve secrecy, lack of support from the husband, the family or the society, the low quality of service accepted on the first visit and unsympathetic health workers' attitude [1].

CLWHA is a vulnerable group that needs to be protected. The State and the Government's obligation and responsibility is to provide support facilities and infrastructure for child protection. A child is defined as a person who is under 18 years old, including those who are still in the womb [3]. Treatment for children, especially CLWHA is one form of child protection. Yet as of the end of 2010, less than one third of children who needed antiretroviral therapy were receiving it. Without treatment, one third of children born with HIV dies before their first birthday; 50% die

before they turn two. The reason for this is that treatment options for children are insufficient. Pharmaceutical companies have invested little in ensuring the safety and efficacy of ARV use in children or in developing child-appropriate drug formulations. Children with HIV/AIDS in low- or middle-income countries are a largely neglected population [4].

The sustainability of HIV/AIDS lifelong treatment greatly influences the outcomes. Problems with the treatment are that the ARVs can only suppress virus replication, the difficulty in obtaining the drugs, low patient compliance to treatment programs, lack of information and understanding about HIV/AIDS as well as the high prices of ARVs. Generic ARVs made in Indonesia is already available, but not supported by the preparedness of medical personnel and pharmacists to support the success of therapy [5]. In Indonesia, commonly used ARVs are among others Duviral, Neviral, Staviral, dan Reviral [6]. Studies conducted by UNICEF and the National AIDS Commission demonstrated the difficulties faced by CLWHA to access health and education services caused by the existence of discrimination, family financial difficulties, poor children's health and the need to care for parents who are also infected [1].

Opportunistic infection (OI) is an infection that often accompanies people with HIV/AIDS (PLWHA) due to the defective system immune, for example tuberculosis (TB), chronic diarrhea, oropharyngeal candidiasis, dermatitis generalisata, persistent lymphadenopathy generalisata [7]. Therefore, not only access to HIV therapy but also to OI treatment is very important in HIV infection treatment.

Access to treatment covers all aspects of comprehensive treatment services which include accessibility (distance, geographical condition),

availability, affordability in terms of cost and acceptability in terms of social/psychological stigma, discrimination, social support [8]. The United Nations Program on HIV/AIDS (UNAIDS) gives the sense of "Universal Access" to HIV/AIDS as a global commitment to increase access to treatment, prevention, care and support for HIV/AIDS. The attempts of controlling and lowering the number of new HIV infections are the goal of the Millennium Development Goals (MDGs) that require special attention [9].

As one of the efforts to increase access, by 2007 the Government had established 237 referral hospitals for PLWHA. Health Facility Research in 2011 results declared about 30% of the Government General Hospital in Indonesia has Voluntary Counseling & Testing (VCT) clinics [10]. Report on the development of HIV/AIDS in the 4th trimester of 2013 mentions that there are 380 health care facilities that serve PLWHA [2]. In terms of availability, the government provides free ARVs, whilst OI drugs are partly covered in the National Formulary as a reference and has to be available in healthcare facilities in the implementation of National Health Insurance [11, 12]. Despite this, the cost of laboratories tests is still borne by PLWHA.

Hospitals treating HIV/AIDS are still limited, especially in urban areas. These limitations are not only in their number, but also in human resources dealing with HIV/AIDS, pediatric ARVs and anti-infectives availability, laboratory facilities, the socioeconomic conditions of the parents/caregivers. All these will eventually exacerbate the disease and cause opportunistic infections as well as antibiotic resistance. Access to treatment in terms of distance and geographical condition from the hospital, cost and health workforce adequacy had been discussed elsewhere [13-15].

This study aims to identify the availability of ARVs and OI medications, trained healthcare workers and laboratory capabilities to manage CLWHA, as well as CLWHA or their caregivers' perceptions of the availabilities.

2. MATERIALS AND METHODS

A cross-sectional study was done in five provinces with the greatest number of PLWHA in Indonesia, namely in Jakarta (North and West Jakarta), East Java (Surabaya and Malang), Bali (Denpasar and Buleleng), Papua (Jayapura City

and District of Jayapura), and North Sumatera (Medan and Deli Serdang) in 2015.

Data on access to treatment were collected by means of in-depth interviews using pre-test questionnaires with health workforce and caregivers. Primary data were obtained from HIV/AIDS program and drugs manager in the Provincial and District Health Office, Hospital Medical Director, medics, non-medics, Head of Hospital Pharmacy Installation, pharmacy staff, laboratory manager, case manager, Director of HIV/AIDS non-governmental organizations (NGO) dealing with CLWHA, Head of Provincial and District Education Office, Regional AIDS Commission, CLWHA's parents/caregivers. Secondary data collected from the hospitals through observation and use of checklists on the availability and competency of human resources, the availability and adequacy of pediatric ARVs and OI medications, medical devices, and reagents for laboratory examination.

The questionnaire concerning the characteristics of CLWHA and relationship with caregivers, source of information about HIV, perception of caregivers on the availability of ARV and OI drugs and laboratory examination done was pre-tested in Bekasi District.

Population: Parents/caregivers of CLWHA

The number of CLWHA recorded by the Health Office in 2013 of the 10 districts/cities was 517 distributed as follows: DKI Jakarta (North Jakarta = 71, West Jakarta = 35), East Java (Surabaya = 87, Malang = 36), Bali (Denpasar = 51, Buleleng = 16), Papua (Jayapura = 93, Jayapura District = 44), North Sumatera (Medan = 76, Deli Serdang District = 8).

The number of parents/caregivers is calculated by estimating a population proportion with specified absolute precision:

$$n = Z^2 P(1-P) / (d)^2$$

(Z=1.96; P=50%; d=.06 and CI 95%)

The result gives 267 respondents which were then taken proportionately in each district/city, as follows:

$$n_1 = n \cdot N_1 / N$$

(n₁= number of samples at location1; n=number of total samples; N₁=number of population at location 1; N=number of entire population).

Table 1. The distribution of the parent/caregiver of CLWHA according to the province

No.	Province	City/District	Number of respondents
1	DKI Jakarta	North Jakarta District	39
		West Jakarta District	17
2	East Java	Surabaya City	46
		Malang District	17
3	Bali	Denpasar City	28
		Buleleng District	9
4	Papua	Jayapura City	45
		Jayapura District	25
5	North Sumatera	Medan City	35
		Deli Serdang District	6
Total sample of parent/caregiver of CLWHA			267

Parents/caregivers of CLWHA were identified through coordination with hospitals or NGOs.

Parents/caregivers that cannot communicate well and those of CLWHA who already lived independently and were qualified to receive ARVs, were excluded. Only data from 239 parents /caregivers can be analyzed concerning their perception of the availability of ARVs and laboratory equipment.

3. RESULTS AND DISCUSSION

3.1 Results

The characteristics of caregivers based on their relationship with CLWHA and their education level are described in Table 2.

3.1.1 The availability of ARVs

The availability of ARVs at Provincial and District Health Office and HIV/AIDS Referral Hospital can be seen in the Table 3.

There were 23 types of ARV available at the Provincial Health Office and 21 types at referral

hospitals. ARVs were still rarely found at the District Health Office. Pediatric fixed dose combination (FDC), such as Zidovudine 50 + Lamivudine 30 + Nevirapine 60, Stavudine 12 + Lamivudine 60 + Nevirapine 50, Lopinavir/r 133.3 mg + 33.3 mg, Stavudine 6 + Lamivudine 30, were only found in one out of ten referral hospitals. Moreover, Stavudine 12 + Lamivudine 60 were not found at all hospitals studied, just like a single dosage such as Stavudine 30 Cap. and Didanosine 125 enteric coated tab.

The name of used ARVs based on structured interview with parents/caregivers was in Table 4.

The most widely used types of ARVs were Nevirapine and FDC of Zidovudine 300 mg + Lamivudine 150 mg (35.5% and 22.9%). The percentage of dispensed ARVs was still great, i.e. 12.4% and the use of 2nd line ARVs was 0.3%.

Based on structured interviews, the availability of ARVs as perceived by the parents/caregivers can be seen in the Table 5.

Table 2. The characteristics of caregivers based on their relationship with CLWHA and education level

No	Characteristics	Sum (N=239)	%
Relationship with CLWHA			
1	Parents	157	65.7
2	Grandparents	32	13.4
3	Uncle/aunt/brother/sister	27	11.3
4	Foster parents	7	2.9
5	Neighbor/caregiver	4	1.7
6	Independent CLWHA	12	5.0
Education level			
1	Basic*	126	52.7
2	Advance**	113	47.3

*Basic: up to Junior High School graduate; **Advance: Senior High School graduate and higher

Table 3. The availability of ARVs in 2014

No	ARVs	Provincial health office (N=5)	District health office (N=10)	Referral hospital (N=10)
1	Zidovudine Cap. 100/Reviral	5	0	8
2	Zidovudine 50 + Lamivudine 30 + Nevirapine 60	1	0	1
3	Zidovudine 300 + Lamivudine 150	0	1	3
4	Zidovudine 60 + Lamivudine 30 + Nevirapine 50	3	0	5
5	Lamivudine Tab. 150	5	0	9
6	Zidovudine 300 + Lamivudine 150	3	2	6
7	Stavudine Cap. 30	4	0	0
8	Stavudine 12 + Lamivudine 60	2	0	0
9	Stavudine 12 + Lamivudine 60 + Nevirapine 50	0	0	1
10	Stavudine 12 + Lamivudine 60 + Nevirapine 100	5	10	10
11	Didanosine chew. tab 100	2	0	4
12	Didanosine ent. coated 125	1	0	0
13	Abacavir Tab. 300	3	1	4
14	Tenofvir Tab. 300	5	1	8
15	Emtricitabine 200 + Tenofvir 300	2	0	5
16	Efavirenz Cap. 200	3	0	3
17	Efavirenz Tab. 600	5	1	9
18	Nevirapine Susp. 200 mg/ml	1	0	0
19	Lopinavir/r 133,3 mg + 33,3 mg	0	0	1
20	Lopinavir/r 200 mg + 50 mg	4	1	8
21	Nevirapine 200/Neviral	1	1	3
22	Tenofvir 300 + Lamivudine 300 + Efavirenz 600	0	1	0
23	Stavudine 6 + Lamivudine 30 ped	0	1	1
24	Tenofvir 300 + Emtricitabine 200/ Emtriva	1	1	0
25	Tenofvir 300 + Lamivudine 150 + Efavirenz 600	0	0	2
26	Nevirapine 200	1	0	1
27	Tenofvir + Lamivudine + Efavirenz	1	0	0
28	Stavudine 30+ Lamivudine + Nevirapine 50	1	0	2
29	Emtricitabine	1	0	0

Table 4. The used ARVs based on structured interviews with the parents/caregivers

No.	Drug	Sum	%
1	Nevirapine	110	35.5
2	Zidovudine 300 mg + lamivudine 150 mg	71	22.9
3	Efavirenz	27	8.7
4	Lamivudine	21	6.8
5	Stavudine	12	3.9
6	Zidovudine 60 + Lamivudine 30 + Nevirapine 50	10	3.2
7	Aluvia	10	3.2
8	Abacavir	7	2,3
9	Tenofvir	3	0.9
10	Zidovudine	3	0.9
11	Lopinavir/ritonavir (2 nd line)	1	0.3
12	Dispensed ARVs	37	12.4
	Total	310	100.0

Note: A CLWHA might use more than one kind of drug

Table 5. The availability of ARVs according to the perception of parents/caregivers

No	District/City	N	Available	Unavailable
1	North Jakarta	45	39 (86.7%)	6 (13.3%)
2	West Jakarta	21	18 (85.7%)	3 (14.3%)
3	Surabaya City	44	43 (97.7%)	1 (2.3%)
4	Malang District	16	12 (75.0%)	4 (25%)
5	Denpasar City	24	24 (100%)	0
6	Buleleng District	19	17 (89.5%)	2 (10.5%)
7	Jayapura City	22	20 (90.9%)	2 (9.1%)
8	Jayapura District	15	15 (100%)	0
9	Medan City	22	21 (95.5%)	1 (4.5%)
10	Deli Serdang Distr.	11	10 (90.9%)	1 (9.1%)
Total		239	219 (91.6%)	20 (8.4%)

91.6% of parents/caregivers CLWHA said that ARVs were always available.

VCT clinic doctors and nurses as well as pharmacy staff in HIV/AIDS referral hospitals in Jakarta Province, said that the availability of ARVs was adequate, but not of pediatric FDC ARVs such that CLWHA ha to be given adult dosage form in divided doses.

Head of VCT clinic in East Java said that ARVs were enough including the 2nd lines, but FDC preparations like Triomune® was limited. Whenever a child was given Duviral®, parents/caregivers were asked to cut it into two themselves, and they were taught to grind it if the child could not take tablets yet. According to a nurse at the VCT clinic, medications for OI sometimes were unavailable and the patients other than a social security program (BPJS) participant were prompted to buy themselves.

Doctors and nurses and also pharmacy staff in HIV referral hospitals in Bali Province, said that there were no ARVs syrup for CLWHA and they used adult drugs to be crushed. The use of powdered form actually involves the risks of under dose and destruction of drug during storage. There is no difference in medication for infants, the under threes, toddlers, and teenagers. There were several medications unavailable like Cotrimoxazole.

"... There are ARVs, not for a child, but adult drugs are used. We never get children's medications. There is a problem, such small dose if powdered will be quite a few. For example, to use nevirapine in a dose of 6 mg, while the available dose is 200 mg, how should it be divided?" (Pediatrician)
 "... .. cotrimoxazole is empty for some months recently. There may be delays or

lack in stock, but we have already contacted the Health Office "(VCT clinic physician)

In Papua Province VCT clinic doctors, nurse and pharmacist, said that ARVs syrup were yet unavailable for CLWHA, currently they were still given powdered form and its availability was enough. ARVs were given for 2 weeks use and supporting medications like pain reliever and probiotics were unavailable.

Likewise, doctors and health personnel in North Sumatera Province, said that the pediatric FDC occasionally came late (sometimes too late, up to 6 months) that they had to give adult tablets to be powdered. The available ARVs at data collection period were Stavudine, Lamivudine, Nevirapine, but many children could not tolerate it (vomiting).

The availability of ARVs at the provincial level was 9 months, while at district level was 6 months and at health facility level was 3 months. The problem of ARV's availability was that the ARVs provided by the Global Fund (GF) were many in numbers yet nearly expired. In Bali, the hospital demand for ARVs surged exceeding the existing stock in pharmacy unit. The obstacle in Jayapura was that electricity often went out, while the ARVs had to be kept in an air-conditioned room to assure their quality.

Pharmacist suggested not to give adult ARVs to children in powdered form, because of concern of under dose, spoiled drug and time to dispense. Furthermore, powdered adult ARV gradually becomes sticky and does not dissolve in water so that it is often vomited by the child.

The relation between the respondents' perception of the ARVs availability in the referral hospital and their education level by Chi square test can be described in Table 6.

Table 6. The relation between the respondents' perception of the ARVs availability in the referral hospital and their education level

Education level	ARVs availability		Total	p-value	OR (95% CI)
	Unavailable	Available			
Basic	11 (8.7%)	115 (91.3%)	126 (100.0%)	0.831	1.105 (0.440 – 2.774)
Advance	9 (8.0%)	104 (92.0%)	113 (100.0%)		

The respondents' education level does not relate statistically to their perception of the ARVs availability in the referral hospital ($P=.83$).

3.1.2 The availability of Opportunistic Infection (OI) drugs

Based on checklists for the Provincial and District Health Office and HIV/AIDS referral hospital, the availability of most often used OI drugs are in Table 7.

The OI drugs such as Azithromycin, TB FDC for children, pediatric Cotrimoxazole, Nystatin, Pyrimethamine and Vitamin A were only available in a small fraction of hospitals.

As for the OI treatment in Jakarta Province, in general, OI drug often can still be provided, unless drugs such as Amphotericin and Cotrimoxazole syrup. The only procured drug for treating OI by the hospital was Cotrimoxazole for BPJS participant, but sometimes Cotrimoxazole, pediatric TB FDC and Nystatin which were purchased by the hospital on its own were also provided. Meanwhile, in East Java, the drug that was often prescribed for OI is Cotrimoxazole and pediatric TB drug besides Metronidazole and Fluconazole.

In Bali Province the OI drugs often prescribed are, among others Cotrimoxazole and Vitamins and antifungal, CTM and amoxycillin. Nevertheless, Cotrimoxazole at the time of data collection could not be found. Likewise, in the province of Papua, the most often prescribed drugs were Cotrimoxazole, Fluconazole, cough and common cold remedies such as Paracetamol, Interhistin®, Nystatin, and Azithromycin. OI drug frequently in shortage was a type of probiotic usually used for diarrhea, skin ointments, cold medication such as Alco®, Cefixime and Cefadroxil. Just like the other provinces the procurement of OI drugs in Papua was supported by local and central budget, and also by GF. The procurement of drugs used in primary health care and provincial buffer used e-catalogue. Primary Health Care might also do the procurement using BPJS fund.

In North Sumatera frequently used OI drugs were Cotrimoxazole, Clindamycin, Ciprofloxacin, Metronidazole, Fluconazole, Pyrimethamine. Constraints of the procurement using the e-catalogue were sometimes certain items were not included in the e-catalogue.

The availability of OI drugs at the provincial level was 6 months. Buffer drug procurement of the province was prepared for 18 months, which also contained OI drugs.

3.1.3 The availability health workforce treating HIV/AIDS in the health facility

The availability of health care personnel to care for CLWHA can be described in the Table 8.

All types of health workers as well as non-medics were available at all of the hospital.

To find out the availability of human resources in the HIV/AIDS referral hospital, we conducted in-depth interviews with doctors, nurses, pharmacists and medical laboratory staff. The human resources in question are pediatricians, general practitioners, nurses, pharmacists/pharmacist assistants, clinical pathologists, medical laboratory personnel, and case managers. The results of the in-depth interviews with health workers and supporting personnel at each selected hospital and district health office show that the availability and adequacy of health care personnel in each district/city are as follows:

In Jakarta Province it is said that the number of personnel serving CLWHA was sufficient and already trained through the in-house training on CST (Care, Support and Treatment), PMTCT, and so on. But there was still stigma from some medics or non-medics against HIV/AIDS patients. The pharmacy staff in the hospital was enough, but the pharmacist was still loaded with other tasks. Meanwhile, the number of laboratory staff was still lacking, because of 24 hours operating time and also handling the other common examination. Likewise, case managers in hospital were lacking in number compared to

the number of existing patients even though they were already assisted by NGOs or other communities. A case manager stated:

“Actually, there is a lack in the number of case manager, but there are some friends from the NGO can give a hand and also some groups of similar age from a hospital as well as health centers”

The head of VCT/CST clinic in an HIV/AIDS referral hospital in East Java said that the number of personnel that served CLWHA was currently sufficient, well trained, and having good competencies. Medical laboratory and pharmacy staff were adequate and also well-trained. On the contrary, the case manager was not enough and actually 2 more persons were needed even if they were helped by NGOs.

In general, doctor, pharmacy and laboratory staff, nurse and also counselor in Bali Province, said that the available task force compared to the number of patients was still too little and inadequate.

In the province of Papua, not like in the district where only nurses were lacking, medics and non-medics were also still lacking in the city, trained doctor had moved on, and though actually there were many counselors, those who were active were only 2 persons, such like a pharmacist said:

“... the lack of stand-by nurses and doctors, sometimes we have to look for the doctor,

meanwhile the patient's condition was already very weak ...”

Besides pharmacy staff like in the city in North Sumatera Province, trained medics and laboratory staffs were also insufficient in number in the district.

The head of the medical service of the hospital suggested a few things as follows:

“.. For human resources, training is needed for either pediatrician, CST, counselors, Case Manager, PMTCT team and pediatrician. For the means, addition of rooms and specific counseling room are needed and there is a need for medicines and laboratory for examination of HIV in children...”

3.1.4 The capability of the laboratory of HIV/AIDS referral hospital

Based on the checklist for HIV/AIDS referral hospital, the type of test that can be done by the hospital is in Table 9.

Some referral hospitals in Surabaya, Denpasar, Buleleng, Jayapura and Medan had the instrument to count CD4 in percentage and absolute values, but only HIV/AIDS referral hospital in Surabaya had the tools to check the viral load.

The results of the interviews on the associated perceptions of parents/caregivers on the completeness of laboratory instruments for HIV can be seen in the Table 10.

Table 7. The availability of OI drugs at the Provincial Health Office, District Health Office and Referral Hospital

No.	Drug	Provincial health office (N = 5)	District/City health office (N = 10)	Hospital (N = 10)
1	Azithromycin	0	0	1
2	Fluconazole	3	2	5
3	TB FDC for children	2	7	2
4	Ketoconazole	1	5	4
5	Ketoconazole cream	1	5	4
6	Clindamycin	2	3	4
7	Cotrimoxazole susp.	1	8	5
8	Cotrimoxazole ped tab	1	5	2
9	Cotrimoxazole tab	3	7	4
10	Metronidazole	4	7	5
11	Nystatin	1	3	2
12	Pyrimethamine	2	0	1
13	Ciprofloxacin	2	4	4
16	Vitamin A	1	5	1

Table 8. The availability of health care personnel in the Referral Hospital

No.	Referral hospital	Pediatrician	VCT physician	Nurse	Pharmacy staff	Laboratory personnel
1	North Jakarta	*	*	insufficient	insufficient	insufficient
2	West Jakarta	enough	enough	*	enough	*
3	Surabaya city	*	insufficient	insufficient	enough	insufficient
4	Malang district	*	enough	enough	*	insufficient
5	Denpasar City	insufficient	*	insufficient	insufficient	insufficient
6	Buleleng district	enough	insufficient	enough	insufficient	insufficient
7	Jayapura city	insufficient	insufficient	enough	enough	insufficient
8	Jayapura district	enough	insufficient	enough	enough	*
9	Medan City	enough	*	Insufficient	enough	enough
10	Deli Serdang district	enough	insufficient	insufficient	insufficient	*

* Information not obtained

Table 9. The availability of devices/facilities for HIV test based on district/city

No	Referral hospital	Device		
		Diagnostic rapid test kit	CD4	Viral load
1	North Jakarta	Unconfirmed		
2	West Jakarta	Y		
3	Surabaya City	Y	Y*	Y
4	Malang District	Y	Y	
5	Denpasar City	Y	Y*	
6	Buleleng District	Y	Y*	
7	Jayapura City	Y	Y*	
8	Jayapura District	Y		
9	Medan City	Y	Y*	
10	Deli Serdang District	Y	Y	

Description: Y = available; * The CD4 count can be used as a tool either in percentage or absolute value

Table 10. Distribution of perceptions of parents/caregivers of CLWHA on the completeness of laboratory instruments for HIV test based on District/City

No	District/City	N	Complete	Incomplete
1	North Jakarta	45	29 (64.4%)	16 (35.6%)
2	West Jakarta	21	13 (61.9%)	8 (38.1%)
3	Surabaya City	44	38 (86.4%)	6 (13.6%)
4	Malang District	16	8 (50.0%)	8 (50.0%)
5	Denpasar City	24	11 (45.8%)	13 (54.2%)
6	Buleleng District	19	9 (47.4%)	10 (52.6%)
7	Jayapura City	22	16 (72.7%)	6 (27.3%)
8	Jayapura District	15	13 (86.7%)	2 (13.3%)
9	Medan City	22	21 (95.5%)	1 (4.5%)
10	Deli Serdang District	11	10 (90.9%)	1 (9.1%)
	Sum	239	168 (70.3%)	71 (29.7%)

Table 11. The perception of the completeness of HIV laboratory instrument in the Referral Hospital, according to the respondents' education

Education	Laboratory completeness		Total	p-value	OR (95% CI)
	Incomplete	Complete			
Basic	42 (33.3%)	84 (66.7%)	126 (100.0%)	0.195	1.448 (0.826 -2.540)
Advance	29 (25.7%)	84 (74.8%)	113 (100.0%)		

Most of the respondents (70.3%) said that HIV laboratory instrument was fairly complete.

The perception of the completeness of HIV laboratory instrument in the Referral Hospital, according to the respondents' education and its relationship can be described in Table 11.

There is no statistically significant relationship between the respondents' perception of the completeness of HIV laboratory instrument in the Referral Hospital and their education level.

3.2 Discussion

The parents/caregivers of CLWHA, who were successfully interviewed, were 239 (89.5%) from 267 respondents planned. This was due to the cumulative existing data for the CLWHA, some CLWHA had died, CLWHA had become an adult, CLWHA joined their relatives outside the study area, the respondents refused to be interviewed because of the existence of the stigma, the respondents could not be contacted again, the respondents were hard to be reached in remote areas (especially in Papua Province), CLWHA was ill and caregivers could not be interviewed, parents/caregivers were busy. Most of them came from cities of Surabaya, Jayapura, North Jakarta and Medan. Characteristics of the parents/caregivers here do not represent characteristics of them in general in society, but only of those who were willing to be interviewed because they were introverted population due to the fear of stigma. A parent/caregiver who belongs to middle-class and upper-class economic status and who had a seat in the community, such as government employee mostly refused to be interviewed.

3.2.1 The availability of ARVs, OI medications and health laboratory equipment

Most (91,7%) of the parents/caregivers said that drugs were always available, but some children were actually getting ARVs in an adult dosage form which were dispensed (12.4%). The results of the interviews with pediatricians also revealed the existence of difficulties in administering ARVs, so the children were given adult ARVs, which was broken down into smaller doses for children (< 10 kg) and so it had to be given in the form of syrup or liquid or suspension. In spite of being easily given to children, syrup form has a constraint in its storage and distribution because it requires a large space. Chris W Green of Spiritia Foundation argues that the ARVs syrup is

indeed easy to drink and has a fixed dose, however, it is also often the cause of dosage errors. Two studies proved that protease-inhibitor-based combination therapies should be used extensively in HIV-infected infants. However, this combination of liquid formulations is impractical for caregivers, is unpalatable for children, requires refrigeration, and owing to drug interactions, is difficult to manage in cases of coinfection with tuberculosis [16]. In practice the form of syrup is hard to keep. For example, ARVs that consist of 3 types like Zidovudine, Lamivudine and Nevirapine are needed as much as 18.5 bottles a month. This will make it difficult to bring them and furthermore they should be stored in the refrigerator, that it must be ascertained the parent/caregiver has a fridge and the fridge will be full of ARVs. In addition, the ARV syrup is twice as expensive as compared to the tablet. Powder making is not recommended for ARV such as Aluvia, because they are too sticky to be crushed. This may result in either excessive or suboptimal doses because of uneven cuts. Improper doses can cause resistance. Administering adult ARV doses for children is also often charged by the hospital pharmacy. A study by Waning et al (2010) to analyze product availability and utilization reveals challenges for development of pediatric formulations and HIV/AIDS treatment in children shows that prices for pediatric FDCs were considerably lower than liquids but typically higher than half of an adult FDC. Continued innovation in pediatric ARV development may be threatened by outdated procurement practices failing to connect clinicians making prescribing decisions, supply chain staff dealing with logistics, donors, international organizations, and pharmaceutical manufacturers [17].

Currently ARVs for children is still very limited. The hospital in Buleleng said that they never received children's ARVs so as to give the right dose. The lack of many drugs in pediatric formulations and limited data available on appropriate dosages for infants may have an impact on the effectiveness of regimens. Most of the children who require therapy reside in poor settings where access to optimal regimens can be problematic, and where clinicians may have to rely on fixed drug combinations [18]. Likewise, some pediatricians at the time of the interview said the same. Observation using the checklist also pointed out the lack of children's ARVs in the hospital. There are twelve kinds of ARVs approved for children i.e. Delavirdin (DLV), Efavirenz (EFV), Nevirapin (NVP), Nelfinavir

(NFV), Ritonavir (RTV), Lopinavir/Ritonavir (LVP/r), Amprenavir (AMP), Indinavir (IDV), Saquinavir (SQV/r), Atazanavir, Fosamprenavir, Enfuvirtid (T20) [9,19]. A study on the impact of treatment access on HIV stigma in Botswana after the introduction of a national program of universal access to antiretroviral therapy shows that antiretroviral therapy access may be a factor in reducing HIV stigma [20].

The perception of the availability of ARVs in the Referral Hospital, according to the respondents' education shows no significant relationship with their education level (Table 7). A study on the relationship of predisposing, enabling and reinforcing factors of health service utilization by women infected with HIV/AIDS shows that knowledge which is closely related to education level is the determining factor in the utilization of health care services [15]. While the study of Suriyani, et al. found a relationship between the availability and acceptance in the utilization of VCT services, and no relationship between the accessibility and affordability of VCT service utilization [21].

Stock out of ARVs for children should not occur. It has become the government duty to provide them nationwide. This obligation is stated in the MoH regulation No 21 of 2013 about Tackling HIV and AIDS. Whereas the responsibility of the regional government of either the province or district/city is to guarantee the availability of the primary and referral health care facilities in controlling HIV/AIDS in accordance with their capability.

3.2.2 The availability of health care personnel in HIV/AIDS treatment facilities

According to MoH Decree No. 832/Menkes/SK/X/2006 on determination of HIV/AIDS Referral Hospital and service standard of HIV/AIDS referral hospital and its satellite, an HIV/AIDS referral hospital must have an HIV/AIDS working group or team involving multi discipline and profession that includes general practitioner/specialist, counselors, pharmacists, nurses, laboratory staff, nutritionist, recording/reporting staff, the case manager and radiographer (optional). The results of this study show that most of the hospital already had an HIV/AIDS working group which included professions such as mentioned above, only one hospital in Jayapura that had a case manager multitasking as a midwife.

The results of interviews in 10 districts/cities found that no specific nurse handling just CLWHA was on hand. In several districts/cities available nurse was still in shortage, like in West Jakarta, Surabaya and Jayapura District. Most of the nurse had already been trained on HIV/AIDS. The results of interview with the pediatricians reveal that most of the hospitals had sufficient number of pediatrician and could handle CLWHA well. Only an HIV referral hospital in Deli Serdang district had no trained pediatrician to handle CLWHA and unable to give the right dose for CLWHA so that they should be referred to a hospital in Medan city. Shortages of pharmacy staff were only found in hospital in the City of Denpasar, Jayapura and Medan, and Deli Serdang District (in particular those who were already trained to handle CLWHA drug). The role of pharmacists in an HIV/AIDS working team at the hospital is managing ARVs and OI drugs inventory, providing drug information, drug counseling, and monitoring compliance to therapy.

Trained medical laboratory personnel in several hospitals such as in North Jakarta, Medan and Deli Serdang district were still lacking. The hospital in Jayapura city did not perform HIV examination and only cared for the OI. HIV examinations were referred to a private hospital in Jayapura.

Hospitals still didn't have distinct case managers dealing with CLWHA. Their number in the hospital was still lacking, partly assisted by the presence of NGO who helped them in hospitals in North Jakarta and Surabaya City. While hospital in Jayapura had no case manager at all, but a midwife who multitasked as a counselor and case manager. Most of the case managers in hospital were high school graduates, based on the MoH Decree No. 1507/Menkes/SK/X/2005 which states that the case manager may come from non-health staff with a minimal education of high school and already trained in case management.

Concerning the adequate number of medical and non-medical personnel who handle CLWHA, most hospital would be still in shortage. Furthermore, the majority of hospitals also had not yet had personnel who specifically handle CLWHA, except for pediatricians. Some medics there also had never been trained to deal with HIV.

Personnel dealing with HIV/AIDS in this study consisted of health and non-health workers. Case managers also partly came from health workers.

Most of the case manager in the hospital came from a nonhealth worker (high school graduates), but in Malang and Jayapura they came from health care personnel (nurses and midwives). It corresponds to the MoH regulation No. 21 by 2013 about Tackling HIV/AIDS wherein the second part of article 43 it is stated that human resources in tackling HIV and AIDS include health and non-health workers. Personnel in some hospitals had not received training about HIV/AIDS and was inadequate in number. This is because some of them have multitasks, such as nurses or midwives.

3.2.3 The capability of the HIV/AIDS laboratory of referral hospital

Based on the Decree of the MoH RI No. 451/Menkes/SK/XII/12/2012 about Referral Hospital for PLWHA, 278 hospitals were set up as referral hospitals. One of the points that was emphasized is to establish infrastructure and facilities in accordance with the guidelines [22] including the availability of laboratory for HIV/AIDS examination. The capability of HIV/AIDS laboratory of Referral hospital cannot be separated from the availability of reagents, devices, trained personnel and support from the hospital management. The problem in the referral hospital in Jayapura is that the examination was not done in one laboratory. HIV/AIDS examination was done at the VCT clinic, whereas OI check-up was carried out in the hospital laboratory. As a result, the procurement of reagents and consumables was done separately. The solution was taken by trying to talk with the hospital management and medical doctor in charge of the VCT clinic but there had been no settlement yet.

The study shows that out of 10 hospitals, only referral hospital in Surabaya had facilities for measuring viral load, so the other hospital had to refer to the regional medical laboratory or other hospital, increasing burden of the patient. Not all CD4 Count can be applied to a child, but only the one that can compute in percentage [19]. Therefore, conversion needs to be done, but the results are less accurate. Referral hospitals that had a tool for measuring CD4 in percentage were hospitals in Surabaya, Denpasar, Medan, Buleleng District and Jayapura District.

Unfortunately, some of them lacked the necessary reagents. A child under 1.5 years should be checked using PCR, however, PCR diagnosis had to be referred to the regional medical laboratory and only for specific cases. Diagnosing a child under 1.5 years is rather tough, so that presumptive diagnosis based on the symptom severity was used.

The availability of the PPE (personal protective equipment) had not been adequate yet, only mask and gloves were available. The body should be protected from top to bottom and medical laboratory personnel need supplement to enhance body's endurance. It will be better if there is a special room for HIV examination.

The results of the interview on the associated perceptions of parents/caregivers of CLWHA against the completeness of laboratory instruments for HIV shows no significant relationship with their education level (Table 11). A mixed method longitudinal study on patient care experiences and perceptions of the relationship shows that being seen within 15 minutes, receiving visit reminders, effective provider communication, and satisfaction, positively influenced patient perceptions of the patient-provider relationship [23].

Laboratory services as an integral part of health care is needed in an effort to improve health and to prevent and cure diseases as well as health recovery. Several factors must be considered to choose or equip laboratories to perform virologic HIV testing. Physically, the laboratory must have a steady flow of water and electricity, as well as appropriate storage facilities, including fridge and freezer. It must set good laboratory procedures, guided by the code of practice and documented standard operating procedure and good controlling system. The responsibility of each staff member should be set and documented distinctly. Staff should be involved in quality control and trained in health management and safety. A study by Sugiharti and Heny shows that the readiness of four hospitals varied in PMTCT implementation, but mostly because of the unpreparedness in terms of infrastructure (reagents, drugs, health, tools, laboratory) [24].

Human resource is the most important element to achieve the objectives. The higher the level of utilization of human resources will be the higher the level of utilization of other resources. Based on in-depth interviews with informants, it can be concluded that the existing laboratory staff has

not been sufficient in number yet, laboratory services then could not be carried out properly.

Not all medical laboratory personnel handling HIV/AIDS in that ten hospitals have got HIV/AIDS training. A person's ability not only depends upon educational background alone, but also from the type of training ever followed. Currently, the most important is the competencies to be able to manage the program properly such that the desired goals can be achieved. Therefore, training for handling of HIV/AIDS in referral hospital is urgently needed to improve the performance or competencies of the staff to accomplish the output assigned.

A strong commitment from the central and local government in the provision of tools and reagents for HIV/AIDS testing such as PCR, Viral Load and CD4 for children is indispensable in enabling a referral hospital to support laboratory capability in the treatment of HIV/AIDS in children. Besides, those involved need HIV/AIDS training on a regular basis, especially for those who had never been trained before.

4. CONCLUSION

The availability of ARV combinations and OI medicine for CLWHA at some hospitals were limited or even unavailable in certain hospitals. The availability of nurses to care for CLWHA was still lacking, and generally there were still many who had not received specific training. The comprehensiveness of the referral hospital laboratory equipment and capabilities as an adjunct in treating CLWHA was not sufficient. The examination of viral load can only be done in one hospital and CD4 percentage cannot be counted in all hospitals. The availability of reagents was also very limited. There is no relation between respondents' perception of the completeness of laboratory equipment and of the availability of ARVs with their education level. Overall, it can be concluded that treatment facilities for CLWHA are still very limited.

CONSENT

As per international standard, written consent of every children parents/caregivers has been collected and preserved by the author.

ETHICAL APPROVAL

Ethical Clearance was obtained from the Institutional Review Board-NIHRD-No.LB.02.01/5.2/KE071/2014.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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