

ORIGINAL ARTICLE

**THE EFFECTIVENESS OF COMMUNITY-BASED
MENTAL HEALTH PROGRAM BY COMMUNITY
HEALTH CENTERS ON THE RECOVERY OF
PATIENTS WITH PSYCHOSIS IN ACEH**

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Abstract

Objective: This study aimed to identify the effectiveness of Community-Based Mental Health Program on the recovery of individuals with schizophrenia and psychosis by comparing patients who had hospital-based treatment (HBT) at the hospital and those who had treatment in the community-based mental health program (CBMHP) at community health centers. **Methods:** The study design was a retrospective cohort with 92 subjects participating in the CBMHP and 114 subjects receiving the HBT at the Mental Hospital of Aceh Province. In this study, the evaluated outcomes on subject's recovery included self-care and functional status as well as self-care and functional composites in addition to the cost which had been spent by the government for 7 years. The evaluators were nurses who worked at the Mental Hospital and community health care centers. **Results:** The study revealed that there was no difference on outcomes between patients receiving CBMHP and those with HBT. The expense spent on CBMHP was lower than the cost of treatment provided by the Mental Hospital. **Conclusion:** CBMHP for patients with schizophrenia and other psychosis was as good as the HBT at relatively lower cost. We suggest that the CBMHP should be developed further since it is very relevant to geographic conditions in Indonesia, which still has many problems in accessing mental health services. *ASEAN Journal of Psychiatry, Vol. 16 (2): July – December 2015: XX XX.*

Keywords: Community-Based Mental Health Program, Aceh, Recovery, Cost

Introduction

In mental health, there has been a change in the perspective of treatment of mental disorder patients, i.e. from institutionalization, which is a hospital-based concept into deinstitutionalization, a concept which no longer relies on the Mental Health Hospital as the one and only site to provide the treatment. This has consequently, lead to an increasing emphasize to develop a mental health programs globally, also in middle and low-income countries [1].

A Mental Health Hospital was formerly

inhabited by schizophrenia and psychotic patients to undergo a long-term treatment. Both are the chronic mental disorders that significantly affect a major burden in economy. The incidence of schizophrenia ranges from 0.1-0.4 per 1,000 populations or often estimated on 1% prevalence of the population [2]. In Australia, schizophrenia is the 3rd only to that of dementia and affective disorders that leads to high-cost treatment [3]. The disorders have absorbed as much as 15% of the expenditures spent on mental health [3]. In Australia, schizophrenia was ranked 13th of the Disability Adjusted Live Years (DALYs) in 1990 and 2010 [4]. Schizophrenia patients,

compared to those with other disorders, have spent the highest cost on their hospital treatment. It might be surprisingly higher than that of a specific physical illness. The Mental Health Hospital-based treatment dominated by schizophrenia patients has spent about 46% of the total health expenditure [3].

Developing a community mental health program is one effort to meet the needs of mental disorder patients for their treatment, which relies not only on the responsibility of the Mental Health Hospital. One community mental health program to have been developed extensively in Indonesia is a program organized by a Community Health Center (CHC). This program collectively carried out by a team from CHC, i.e. General Practitioner and nurses or paramedic is called a Community-Based Mental Health Program (CBMHP) which was implemented for schizophrenia and psychotic patients in Aceh Province, firstly, in 2005. Aceh is a region in Indonesia, which was hit by a large-scale tsunami at the end of 2004. After the disaster, many health programs implemented to Aceh, including mental health program to reduce health impacts due to disaster.

The implementation of the program needs further evaluation of its effectiveness since this program has spent considerable cost in terms of establishment and health system development. The involvement of CBMHP, along with its financing, should be under prior assessment until it is widely developed in other areas. Various studies around the globe claim that the community mental health program designed for schizophrenia patients has resulted well in terms of functional status, clinical progress, patient's quality of life, working time, and cost [5-7].

Evaluation of the community mental health program of CBMHP in Indonesia has remained based on following cases, i.e. the findings, self-care, shackling (*pasung*), and a few of casual indicators. It also involves several studies on cost-benefit analysis and cost analysis, which cover costs on program implementation and treatment [8,9]. Data and findings of the studies have not yet provided an overall picture of the eligibility of CBMHP for further development due to the absence of

combined outcome and cost. This study aimed at identifying effectiveness of CBMHP towards the recovery of schizophrenia and psychotic patients by comparing patients undergoing Mental Health Hospital with CBMHP-based treatment in Aceh. The result will be evidence based to mental health policy program in Indonesia.

Methods

The design of the study was a historical cohort study which is a non-experimental epidemiological analysis appropriately used in a past event was employed [10]. There were two instruments used in this study such as self-care measurement and Health of Nations Scale (HoNOS). The self-care measurement which was developed by Orem's theory and has been widely used by mental health nurses in Indonesia was employed in this study to assess patients' self-care. Orem more emphasizes to the self-care deficit for measuring improvement of patients [11]. Functional status was measured by adapted HoNOS [12]. Both measures are rating scales. In the beginning of study, we conducted a small study for testing instruments. There were 11 nurses and 55 mental hospital patients involved in this study. Raters are given training and mentoring to share a good agreement among each other. Inter-rater reliability to assess the self-care was evaluated by Kappa coefficient based on frequency of each category. Validity of assessment on self-care status was assessed by sensitivity, specificity, the positive and negative likelihood ratio with Global Assessment Function (GAF) as a reference. GAF is a standard measurement in psychiatric units in Indonesia. In general, sensitivity of self-care measurement towards GAF ranges between 66.67% - 100%, while the specificity is between 41.30% - 63%. Rater reliability with HoNOS was evaluated from the total score of 11 nurses to measure 55 patients. Bland Altman's method was used to assess this reliability [13]. The findings show that inter-rater reliability of the nurses assessing patients' functional status was considered fairly good. Measurement of sensitivity and specificity of HoNOS towards GAF is required to determine validity of HoNOS. Five nurses have 9 cut offs to be determined as the

optimum. The mean of sensitivity is 67.39; the average of specificity is 55.56.

Location and Subjects

The main study was conducted on patients who resided in Banda Aceh city and Aceh Besar district, Aceh Province in 2011-2012. The inclusion criteria include patients: of schizophrenia or other psychotic disorder having suffered since at least 2005 as diagnosed by a CHC physician or psychiatrist, the minimum age was 18 years in 2011, of family/responsible person/guardian who is willing to be the respondents of the study. Exclusion criteria was patients with acute and transient psychotic disorder (F 23), and patients with severe physical disorder (severe mental retardation, severe dementia, and organic mental disorders). CBMHP patients are treated in a CHC, whereas patients of Hospital-Based Treatment (HBT) are undergoing outpatient and inpatient treatment in Aceh Province Mental Hospital. Under official permission of the Department of Health of Aceh Province, CBMHP patients are collected from six CHCs spreading over Aceh Province, i.e. four CHCs in Aceh Besar (Kuta Malaka, Ingin Jaya, Darul Iman) and two CHCs in Banda Aceh city (Meuraxa and Banda Raya).

At the beginning of September 2011, there were 644 inpatients that lived in Banda Aceh city and Aceh Besar District. From 644 of them, only 170 patients fulfill the criteria. In the same time, there were 477 mental disorder patients in six selected CHCs, but only 150 fulfill the criteria. Three hundred and six patients were successfully included in the study until the limit time of November 2011. They consisted of 166 patients from Mental Hospitals and 140 from CHCs. The research permit from local health office for collecting data was 3 months. Not all patients' success taken as subject because of several reasons such as enumerators failed to visit their family until the study finish especially for CHC patients. For mental hospital patients, the reason couldn't reach all selected patients was mostly patients already returned to their home. With reference to this, the data analyzed

involved 306 subjects, i.e. 114 HBT subjects and 92 CBMHP subjects.

Ethical approval was obtained from the Ethics Committee for Health Research and Development Institute of the Ministry of Health, Republic of Indonesia in 2011 and the Ethics Committee for University of Indonesia in 2012.

Data Collection

Data for the study was collected by interview, assessment by enumerators who were nurse, and document review. Activity-Based Costing (ABC) modified method was used for cost estimation. ABC is an accounting method that identifies the activities and calculates direct and indirect costs to products. This method is common to use in health economic research. Modified means we only identified major activities. Enumerators functioning as raters consisted of 11 mental health nurses consisted of 5 nurses from Mental Health Hospital and 6 nurses from CHCs.

Data Analysis

A retrospective cohort study design required the subjects to be free from outcomes that would be initially under assessment so that the analyzed subjects belonged to the group of non-self-care status in 2005. The relationship between the main independent variable and potential confounding variable was assessed by relative risk ratio. The specific variable was determined based on a variable having a significant p-value or $p < 0.25$. The obtained specific variable required was then analyzed by multivariate analysis by including all candidate variables. Bristow's Method for ties of Cox regression was employed as a method of the study with STATA 10.0^{a)} as the statistical program. We calculated the cost for HBT and CBMHP from government perspective with health economic principles. Cost analysis was used to describe total cost for 7 years since the CBMHP has been starting for 7 years.

Results

Characteristics of Subjects

Table 1. Sociodemographic Characteristics of Subjects

Sociodemographic Characteristics	HB^T[^] (n=114)	(%)	CBMHP[#] (n=92)	(%)	p
Mean of age (2005)*	30,38		34,81		0.018
Duration of illness (2005)*	7,42		7,40		0.958
Sex					
Male	91	79.82	64	69.57	0.090
Female	23	20.18	28	30.43	
Marital status					
Unmarried	89	78.07	52	56.52	< 0.001
Married	14	12.28	33	35.87	
Divorce	11	9.65	7	7.61	
Education					
Low(≤ Not finished Primary School)	17	14.91	19	20.65	0.529
Moderate(Finished Primary-Junior High School)	52	45.61	41	44.57	
High (≥ Senior High School)	45	39.47	32	34.78	
Occupation					
Jobless	93	81.58	60	65.22	0.028
Non Labor (civil servants, military, police, student, retired)	6	5.26	10	10.87	
Labor (Farmer, fishermen, etc)	15	13.16	22	23.91	
Residence					
Banda Aceh	59	51.75	69	75.00	< 0.001
Aceh Besar	55	48.25	23	25.00	
Household expenditure Per capita					
Quintile 1	20	17.54	23	25.00	0.142
Quintile 2	17	14.91	23	25.00	
Quintile 3	25	21.93	17	18.48	
Quintile 4	23	20.18	13	14.13	
Quintile 5	29	25.44	16	17.39	

* *Mann Whitney test*

HB^T[^] = Hospital-based treatment; CBMHP[#] = Community-based mental health program

Age and duration of illness analyzed were in accordance with the situation of 2005. Sex, occupation, education and household expenditure per capita described was taken from the data of 2011. The table above shows that both subjects with either the presence or the absence of CBMHP shares similar characteristics on duration of illness, sex, education, and socio-economic status as evidenced by the category of household expenditure per capita, which is divided into

five quintiles (ranging from the lowest of quintile1 to the highest of quintile 5).

Characteristics of Mental Health Disorder

The subjects of the study had similar characteristics on the type of onset comprising an acute onset. Either The CBMHP or HBT subjects owned distinct characteristics on i.e. first onset age, diagnosis of mental disorder, type of episode and mean of 5 year hospitalization.

Table 2. Disorder Characteristics of Subjects

Disorder Characteristics	HBT [^] (n=114)	(%)	CBMHP [#] (n=92)	(%)	<i>p</i>
First onset age*	22,96		27,39		0.001
Diagnosis					
Schizophrenia	96	84	90	97.83	0.001
Psychosis	18	15.79	2	2.17	
Type of Onset					
Acute	15	13.16	19	20.65	0.150
Chronic	99	86.84	73	79.35	
Episode					
Single	1	0.88	9	9.78	0.003
Multiple	113	99.12	83	90.22	
5 year hospitalization					
Yes	107	93.86	50	53.3	< 0.001
No	7	6.14	42	45.65	
Mean of 5 year hospitalization *(n=156)	4.23		1,27		< 0.001

* *Mann Whitney test*

HBT[^] = Hospital-based treatment; CBMHP[#] = Community-based mental health program

Both groups mostly shared recurrent rather than single episode. It shows characteristics of chronic mental disorder as signified by recurrent episode. Non-CBMHP subjects or

Mental Health Hospital-Based patients were found to be more frequently hospitalized than those of CBMHP or CHC.

Table 3. Association between Composite of Self Care and Functional Status Based on Sociodemographic Characteristics and Mental Disorder

Characteristics	Composite of self-care and functional status				RR*	95% CI**	p
	Good n=73		Poor n=133				
	n	%	n	%			
Age							
≥ 27 years	43	35.0	80	65.0	0.967	0.665 ; 1.406	0.862
< 27 years	30	36.1	53	63.9			
Sex							
Female	17	33.3	34	66.7	0.923	0.594 ; 1.434	0.717
Male	56	36.1	99	63.9			
Residence							
Banda Aceh	28	35.9	50	64.1	1.021	0.669 ; 1.491	0.914
Aceh Besar	45	35.2	83	64.8			
Duration of illness							
< 3 years	26	36.6	45	63.4	1.052	0.717 ; 1.543	0.797
≥ 3years	47	34.8	88	65.2			
Age of onset							
<21 years	39	34.2	75	65.8	0.926	0.640 ; 1.338	0.682
≥21 years	34	37.0	58	63.0			
Type of onset							
Acute	8	23.5	26	76.5	0.623	0.330 ; 1.175	0.112
Chronic	65	37.8	107	62.2			
Type of Episode							
Single	4	40.0	6	60.0	1.136	0.520 ; 2.485	0.757
Multiple	69	35.2	127	64.8			

CBMHP***							
Yes	35	38.0	57	62.0	1.141	0.790 ; 1.649	0.482
No	38	33.3	76	66.7			

RR* = Relative Risk; 95% CI** = 95% Confidence Interval;
 CBMHP*** = Community-based mental health program

The age cut off was determined in reference with the previous table that read 27 years of age with 58.90% sensitivity, 39.85% specificity, 0.979 positive likelihood ratio and 1.031, negative likelihood ratio and 46.9% under curve area. Based on these, the variable of patients' age was grouped into ≥ 27 and < 27 .

0.973 positive likelihood ratio, and 1.052 negative likelihood ratio while under the curve, area is 49.3. %. The onset of age cut off is 21 with 56.16% sensitivity, and 37.59% specificity, 0.90 positive likelihood ratio, and 1.166 negative likelihood ratio, while the under curve area is 46.4. %.

Duration of illness and age of onset had numerical data so that the cut off is determined by investigating the most optimal sensitivity and specificity by considering the ROC curve. The duration of illness cut off is 3 years with 64.38% sensitivity, and 33.83% specificity,

According to the above table, it is evident that type of onset has significance of $p=0.112$ so that a multivariate analysis is possible to proceed by including CBMHP variable and type of onset allowing Breslow's method to be employed.

Table 4. Multivariate Analysis CBMP Exposure and Type of Onset to Composite of Self Care and Functional Status

Characteristics	SE*	Z	RR**	95% CI***	p
Type of onset	0.229	-1.32	0.609	0.609 ; 1.272	0.187
CBMHP****	0.277	0.70	1.177	0.743 ; 1.867	0.487

SE* = Standard error; RR** = Relative Risk, 95% CI*** = 95% Confidence Interval;
 CBMHP**** = Community-based mental health program

Multivariate analysis results that, in conclusion, there is no significant relationship between CBMHP exposure and the results on patients having been under control by type of onset. The assessment on characteristics of self-care and functional status undergoing one-to-one evaluation also results more or less similar with table 3 and 4.

CBMHP cost (in CHC)

Investment, operational, and maintenance

costs were calculated for costing indoor component and used annual investment cost (AUC) when counted investment. Table 5 shows that the largest component of cost on CBMHP is Community Mental Health Nursing (CMHN) training in which includes General Practitioner plus (GP plus) that reaches around 56%. The operational cost of CHC ranks the second, 26.24%. The medicine cost covered the smallest, 6.95%. The average unit cost per annum per patient is IDR 1,551,545.

Table 5. CBMHP cost and Unit Cost per Patient per CHC

No	Location and component of cost	Community Health Centre						Total	(%)
		CHC 1 (IDR [^])	CHC2 (IDR)	CHC 3 (IDR)	CHC 4 (IDR)	CHC 5 (IDR)	CHC6 (IDR)		
1	Indoor (CHCs)	43,344,695	10,784,335	62,390,425	53,496,379	64,014,244	57,513,946	291,544,024	26,24
2	Outdoor	19,121,925	5,579,589	22,684,465	23,196,049	27,801,880	21,805,797	120,189,704	10,82
3	Training*	143,804,694	117,554,694	72,554,694	72,142,704	74,017,704	141,929,694	622,004,184	55,99
5	Medicines	11,639,916	10,777,700	7,867,721	17,136,543	12,933,240	16,813,212	77,168,332	6,95
	Total	217,911,230	144,696,318	165,497,305	165,971,675	178,767,068	238,062,649	1,110,906,245	100.0
	Σ Patients**	108	100	73	59	120	156		
	Unit cost	2,017,697	1,446,963	2,267,086	1,043,847	1,489,726	1,526,043	1,551,545	
	Average cost	1,551,545							

. *community mental health nursing (CMHN) training

. **number of patients of CBMHP per CHC; IDR[^] = Indonesian Rupiah

Mental Health Service Cost in Aceh Province Mental Hospital

The component of costs regarded as the patients' service cost in Mental Hospital consists of investment, operational, and maintenance. Other relevant data required for calculating the inpatient and outpatient costs in total include length of stay, average length of stay, and number of outpatient visiting in the outpatient clinic.

The largest cost for mental health service in Mental Health Hospital is the operational and maintenance that spends 84.05% whilst the smallest bears on the investment, 15.95%. The total length of stay in the in Aceh Province Mental Health Hospital is 212,392 days. The number of outpatient visiting in the polyclinic is 14,569 and the average length of stay is 66 days.

Table 6. Costs, Length of Stay, and Number of Visiting in Mental Hospital

No	Component of cost	(IDR [^])	%	Total LOS* (days)	Total outpatients visiting	AVOS** (days)
1	Investment	6,884,339,433	15,95	212,392	14.569	66,09
2	Operational and Maintenance	36,275,755,309	84,05			
3	Total	43.160.094.742	100			

IDR[^] = Indonesian Rupiah; LOS* = Length of stay; AVOS** = Average length of stay

To calculate the unit cost of inpatient and outpatient, information in relevance with their cost ratio is necessarily obtained from the

finance department of the Mental Health Hospital.

Table 7. Unit Cost of Inpatient and Outpatient

No	Component of cost	IDR [^]	(%)
1	Inpatient	41,433,690,952	94
2	Outpatient	1,726,403,790	6
	Total	43,160,094,742	100
	Inpatient cost per day	195,081	
	Outpatient cost per visit	118,498	

IDR[^] = Indonesian Rupiah

In 2011, the total cost of inpatient was IDR 43,160,094,742 and based on the information from the Finance Department of Aceh Province Mental Health Hospital. The ratio between inpatient and outpatient cost is 94:6 [14]. It is therefore, on the basis of this ratio. The total inpatient cost was IDR 41,433,690,952, while the total outpatient cost was IDR 1,726,403,790. Inpatient cost per day

was IDR 195,081 and outpatient cost per visit was IDR 118,498. Unit cost of inpatient with 66.1 days was IDR 12,894,868.

CBMHP versus HBT Cost

The estimated cost component for managing CBMHP and HBT patients is illustrated as follows:

Table 8. Cost Component of HBT vs. CBMHP by Inpatient and Outpatient Category

No	Component of Cost	HBT* (n = 114;IDR [^])	CBMHP** (n=92;IDR)
1	Inpatient	6,215,326,376	1,624,753,368
2	Outpatient	813,133,276	1,015,822,087
	Total	7,028,459,652	2,640,575,455
	Average of cost per patient	61,653,155	28.701.907

HBT* = Hospital-based treatment; CBMHP** = Community-based mental health program

IDR[^] = Indonesian Rupiah

The total inpatient cost of CBMHP and HBT is calculated from the total length of stay to have been recorded from 1 January 2005 to 1 June 2011 multiplied by IDR 195,081 and by the average length of stay (66.1 days). The total outpatient cost of HBT is calculated from the number of outpatient multiplied by IDR 118,498 whilst the outpatient cost of CBMHP is calculated from CBMHP cost per patient per annum, which is in accordance with the cost per patient per CHC multiplied by 7 (years). Data on the table above shows that the cost of HBT is higher than the cost of CBMHP. The non-CBMHP patient has spent IDR 61,653,155 for 7 years whereas the CBMHP patient has spent IDR 28,701,907. The cost difference is approximately IDR 32,951,248.

Discussion

The findings of this study show that there is no relationship between patient characteristics in 2005 (the exposure towards CBMHP, socio-demography, mental disorder) with composite of self-care, and functional status assessed in 2011. It can be inferred that CBMHP (community-based) outcome similar with HBT (hospital-based). The relative risk of all variables shares nearly evenly between the main dependent variables (CBMHP) and other variables that are approximately 1. It shows that either the presence or the absence of CBMHP remains no influence on the patient's condition.

This study reveals that patients of CBMHP spend a much lower cost than HBT. The average cost of individual patients of CBMHP is IDR 1,551,545 per annum. It is evidently higher than that revealed in the previous study which was as much as IDR 565,667. [9] The prior study on the costs did not consider the doctors, paramedics, or cadres training factors [9]. It can be inferred that CBMHP is more economical than alternative programs; the HBT that has long been implemented in mental health service. It is clearly described that the former program being assessed has dominated the latter. It can be concluded that the CBMHP (community-based program) has an approximately similar degree of effectiveness with HBT (mental health hospital-based treatment). It also spends lower cost than that of alternative programs that have been implemented in patients with other psychotic disorders and schizophrenia.

It is recommended that the Ministry of Health of the Republic of Indonesia socialize this program to local governments with a view to building or strengthening the mental health system as well as preparing regulation to support the implementation of the program. This program will be likely to be developed in Indonesia considering the high number of severe mental disorder patients who have not been under appropriate treatment due to inaccessibility to the Mental Health Hospital located in the capital of the province.

It is also expected that Health Department informed its subordinate institution to support the community-based mental health program, particularly managed by CHC. Since the largest component of cost lies in the CMHN training, including the GP and the mental health cadres in community, the Health Department of the district should allocate special funding in their action plan. CBMHP will be better implemented if all local general hospitals have provided a mental health clinic service facilitated with beds for psychiatric patients who are in need of special action i.e. treating them with long-acting medicine or temporary inpatient during acute phase that allow the local general hospital to handle.

The limitation of the study includes using data on historical cohort design, the existence of

retrospective data. CBMHP is a newly widely implemented program in Aceh province in which recording and reporting have not unfortunately met detail's completion. In addition, the rotation of PIC in CHC and Health Department of the district and province has worsened the condition, along with incomplete existing registry in the Mental Health Hospital. It is suggested that a better design, i.e. quasi experimental be used in future research. In addition, a better analysis of health economy can also be used in the further study to assess the results in DALY, QALY units and other typical measure.

A recall bias may also take place due to information collected from the patient's family through an interview, particularly on questions referring to the occurrence in the past five years. The psychotic and schizophrenia patients participating in this study are restricted to those living in Banda Aceh city and Aceh Besar district. It is unlikely that the patients have no difficulty in the access to the health service due to their location. This study also only involves chronic, at the minimum.

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