Intervention Strategy to Increase Growth and Development for Stunted Children Under Two Years with Developmental Delay

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Abstract: Background: The government has made efforts to improve children's growth and development through programs in primary health care, but the reduction in stunting and child development delay has not been as expected. Implementation of these programs needs support from all stakeholders, including health cadres and also the family as the main caregiver of a child. Objective: analyzed the effect of family assistance on the growth and development of the under two years old children. Method: this was a quasi-experimental study with a pre-post control group design. Subjects were 63 stunted under two years old children with developmental delay. The intervention group of 32 children was assisted by trained health cadres, namely the Kader PendampingKeluargaKawalBaduta[KP-KKB] for 4 months, while 31 control group children were not accompanied. Results: The implementation of the KP-KKB strategy model shows: mean different changes in subjects and control of nutritional status HAZ-score of 0.09 [Wilcoxon]; WHZ-Score of 0.2; and WAZ-Score of 0.21 [Paired t-test] in the intervention group. Changes in the mean status of motor development are 3.6; and social personal 0.88 [paired t-test] in the intervention group. The results of the paired statistical test of changes in nutritional status and the initial and final development of each group showed significant changes with a value of p <0.05. Conclusion: the KP-KKB intervention strategy model showed changes in nutritional status and improved development compared to the control group.

Keywords: development, nutrititonal status, stunting, stimulation

1. INTRODUCTION

The children's optimal growth and development are related to qualified human sources. The effort to maintain the baby's and child's health must be proposed to prepare the qualified, intelligent, and healthy generation in the future and also to increase the child's and baby's mortality [1]. However, in the developing country, there are more than 200 billion under five-year-old children who fail to reach their development potential due to poverty, lack of nutrition and health, and lack of parenting[2]. In Indonesia, it is still at the serious levelwhich is 40-59% of children who are at risk to suffer from development problems[3].

A study about intervention combination that joined the nutrition intervention and development shows that both of them consistently show more beneficial synergistic effect

towards toddler's growth and development[4-6]. ResearchinBangladesh showed that there was a significant increase in maternal knowledge, the quality of the parental environment, health practice, and children's language development[7].

Various programs have been planned by the Ministry of health to increase the child's growth and development. The effort to detect the problems has been done by a program called SDIDTK that consists of stimulation, early detection in children's growth and development. The aim program to monitor the children's development and to early intervenein the barriers of child development at the basic service level [8] and referral service[9]. The health service standard for toddlers is to do the monitoring of growth and development, the stimulation using SDIDTK instrument, the guidance of integrated service post and early childhood education programs, the family consultation in the mother's toddler class by using mother and child health's book, care for children under five with breastfeeding for up to 2 years, balanced nutrition food and Vitamin A[10]. One of the principles in handling the child's growth and health is the earlier it is found and handled then the better the prognosis is.

The profile data of toddler's health service in 2018 showed that the weighing coverage is in 68.37%[11]. However, more specific data showed a different trend. The data from Basic Health Research in 2018 showed that there were 54.6% of toddlers weighed in the integrated service post more than 7 times in 12 months recently[12]. Low data were also found in the SDIDTK program coverage. In Jawa Tengah Province, there are only 35.66%[13]. The research result in Magelang Regency stated that the scope data SDIDTK is in 50%[14], the cause of low scope of SDIDTK in Magelang is due to the various and unstandardized process of collecting data, the families that are targeted also has not realized the existence of the program yet, and the low of family participation [14]. Another research in PolewaliMandar, West Sulawesi, found that the public participation in detecting and stimulating the children was still low [15].

Under two years old is a golden period where the growth and development areIrreversible[16-17]. The effort that is done to overcome the problem in a toddler's development is not only in the form of curative efforts but also a promoted-preventive effort that needs deeper information to explain why the development problem occurs. Stunting is also one of the factors affecting the development[18], it cannot be finished by only one side. The deal of toddler stunting repair in 100 regencies/city has proved that this problem should be finished, by involving cross sectors and cross-ministry [10].

Today, it is needed Scale-Up and application of integrated interventions, the synergy of health, nutrition, and development in the program broadly and immediately, based on the proofs in the previous researches, mainly parenting / family-based interventions[19]. This integrated intervention can be integrated without a big amount of money by the existence health service program and even better if it is integrated into other programs [5]. This is along with the family-based program initiated by the Health Ministry. Like the effort in increasing the scope and access to the health service, the government assigns the family approach or called *Program Indonesia SehatdenganPendekatanKeluarga(PIS-PK)* [10].

In accordance with the child's growth and development, a family factor is one of the

affecting factors towards the health status and child nutrition status [20,21]. Through giving a good parenting style [22,23], family assistance is one of the efforts to increase the ability of a family to level up the optimal health status. Based on the background above, this study is aimed to analyze the influence of family assistance done by trained health cadres towards the increase of a child's growth and development.

2. MATERIAL AND METHOD

Design and Subject

The *quasi-experimental* design uses *a Pre-post* research design *with the Control Group.* This research is done to the under-two-year-old children stunting with developmental barriers, who are inclusively and exclusively qualified, which are children who are in 6 to 20 months, donot have a chronic disease, live in the research area, and no plan of moving outside the area. The subjects are 63 children under two years old with developmental barriers, the intervention group is 32 children who got assistance from health care, called *Kader PendampingKeluargaKawalBaduta(KP-KKB)* for 4 months, while 31 children who are in the control group did not get assistance. The criteria of cadre are minimally able to read, write, and deliver the information and stimulation that is given in the training.

In the early study, both the intervention and control group get training about the child's growth and development. Both groups are hoped to access the existing program in the community health centers related to the child's development every time. The evaluation is done 4 months later and only 55 children left with some details are 4 children from the intervention groups dropped out and the control group as well. They dropped out because there are 5 children who moved out and 3 children who did not come in the last evaluation.

Collecting and Measuring Data

The research was done in early 2019 in Wonosobo Regency. There were 455 screened children under two years old in the chosen district and got 63 children stunting with developmental barriers. The screening was done by the nutritionist, doctor, and psychologist. The child's body length was measured by a nutritionist using a validated *Length Board;* the bodyweight measurement used AND brand digital scales with 0.01kg accuracy. Meanwhile, the measurement of development used *Developmental Milestones Checklist (DMC)-II* did by a psychologist. *DMC-II* is a measurement of a child's development aged 0-24 months, involving the observation and structural interview towards 66 development *checklist* items. *DMC-II* covers three domains: motor, language, and personal-social development. Each item is scored 0, 1, 2, or N. The score 0 is gained if a child has never been observed in doing the referred activity, or in the observed practice, a child fails/cannot do the preferred activity. Score 1 is gained if a child has been able to do the referred activity before but not continuously for 4 weeks or recently can do in less than 4 weeks. Score 2 is obtained if a child has been able to do a certain activity in the last month or continuously in the last 4 weeks. N is when the parents/baby sitter does not know/remember/observe and gauges do not have many chances to observe/the child refuses. The total score gained in each domain also the total score is compared with normally based on the age group to see whether the

development category is under, normal, or above the average[24].

KP-KKB is 17 chosen health cadres who have joined some training which is feeding baby and children (PMBA), early detecting and stimulating child's growth and development, the health of children under two years old, and introducing some programs related to the child's growth and development. During the mentoring, the cadres are provided with companion cadre module KKB, pocketbook KP-KKB, activity checklist that must be done, and cadre activity logbook. A companion cadre does a *Home Visit*every week in 4 months [17] times *Home Visit*. The role of a cadre during *Home Visit* is: to identify the problem of child's development using KPSP (pre-development screening questionnaire), do and guide the mothers to stimulate the child's development according to developmental problems experienced, train the mothers to provide good PMBA, give health education, introduce/approach the programs related to the child's growth and development, guide the mothers also their family to continuously detect and stimulate the development.
Data Analysis

The analyzing data uses SPSS.15 computer program. It is descriptively seen from the initiate changing to the last from each variable, delta change in mean before and after the intervention, and statistic test uses *Chi-square* test to see the proportion differences, *Wilcoxon, paired t-test* to see before and after intervention in the groups and *independent t-test* to see the mean differences between the groups.

3. RESULT

Table 1 shows the characteristic of the research subject, the child's age, gender variable, and parent's education/occupation, both groups are in homogeny condition (no difference). The result of the homogeneity test of each variable shows the value p>0.05. Table 2 shows the subject status in the early study. The results of statistical tests on the diversity of intervention subjects and control subjects show Homogeneity Variant Score, the development and nutrition status show that both groups are in homogenycondition with value p>0.05. Intable 2, it gives a picture that there is a developmental barrier shown in the nutrition status based on *HAZ, WHZ,* and *WAZ* while the development status is shown in the motor, language, and personal-social development.
The effort of the companion cadre that played role in guiding the toddler's guardian family for 4 months can be seen in table 3. The change of research subject happened in all growing variables, generally, in both groups, the change happened in a better way. The change dominantly occurred in the *HAZ*-score category.The development status in each variable of the intervention and control group evenly shows improvement, the change dominantly occurs in the motor development variable.

The mean changes in each variable of nutrition status and development status mostly show the change in both intervention and control group with value p<0.05, except in the *WAZ* group with value p>0.05, in both groups. The mean change in the intervention group shows a bigger number than in the control group. This higher increase occurs in the aspect of motor

and personal-social development.

4. DISCUSSION

Under two years old children are a golden period to increase their growth and development that will determine the future quality of life[8]. However, this age is where they have a risk to suffer a growth and development barrier if the parents/family do not pay attention to the given parenting[19]. The parents/family are hoped to have the ability in controlling the child's health so they can grow and develop optimally [25]. The parent's knowledge mainly in the village area where the literacy and access towards the limited health programs are caused by the knowledge, facilities, and infrastructure. To overcome the problem, the involvement of health care to help monitoring the child's growth and development is crucially needed. They are hoped to be able to deliver information about the health programs, encourage mothers to access the existing health service, and stimulate growth and development in Integrated Healthcare Center [26].

Stimulation done at an early age is a successful key to increase the child's growth and development. This research collected data ona child's growth and development at the age of 6-18 months. The data collection is done by finding children under 2 years old suffering stunting with a developmental barrier. Table 1 shows the characteristic of the research subject, age variable, gender, and parent's education/job, both groups are in homogeny condition. The result of the homogeneity test shows a value p>0.05. The age of the children is evenly 12.5 months, the gender is also balanced by female and male group, and the parent's family characteristic, the education average is Secondary School and Junior High School, with parent's occupation, is mostly farmer.

Table 2 showed the subject status in early research. The results of statistical tests of the diversity of intervention subjects and control subjects showed Homogeneity of Variance Development Score and WHZ, HAZ, WAZ scores showed that the two groups were in no difference (homogeneous) with a p value> 0.05, the results of the mean difference between the two groups showed no difference(homogeneous) with value p>0.05. in table 2, it gives the picture that there is a developmental barrier showedin the *WHZ, HAZ,* and *WAZ Score.* Meanwhile, the development status is shown in motor, language, and personal-social development. The development barrier in personal social is dominantly 89.3% in the intervention group and 81.5% in the control group. It is not so different from the result of the cohort study held in Bogor to the 951 children, there were 35%-65% of children suffer fromthe developmental barrier. While in the research result of Lu, et. Al stated that 43.0% are a risk to suffer from the developmental barrier, and 40.0-49.0% of Indonesian children suffer from the developmental problem [3].

Personal social development is one of the variables in the development status examination. It covers the children's ability to understand them, connect to their surroundings, and follow the social rules and attitude towards other people. Personal social development is often related to the child's emotional development.

The effort of the companion cadre who has a role in assisting the family to guide the children for 4 months is seen in table 3 and table 4. The change of research subject in each growth

variable, generally in both groups is in a better chance. It dominantly happened in the *HAZ-Score* category when there are 17 subjects (70.8%), in the early research, the status is -3SD s/d <-2 SD (short) into -2 s/d 2 SD(normal)at the end of the research. In the *WHZ* category, there are 23 subjects or 92.0% no changing, but there is 1 subject 4.0% getting better and 1 subject 4.0% getting down. Similar research has been done and the result stated that the trained cadre can increase the maternal knowledge and ability in caring for their baby and toddler [27],[26].

Table 4 shows that 10 out of 12 subjects get better motor development status. There are 9 subjects (75.0%) that become normal and 1 subject (8.3%)has a development that more than their age [above average]. Meanwhile, from the language ability side, there are 3 out of 4 subjects get better (75.0%). In the personal social development aspect, there is 13 form 23 subjects get better (56%). These results are similar to the previous research in 2011 held by Purwandariet al showing that the increase of family role and social support can give a positive effect onthe motor, language, and personal-social development of the children [25].

Table 5 shows the change in each development and nutrition status variable. In the intervention group and control group with p<0.05, except in the *WAZ* score p>0.05. The mean change in the intervention group shows a bigger number than in the control group. The higher increase happened to the aspect of motor and personal-social development. From the result of the statistic test, there are 5 out of 6 aspects in the intervention and control group that have significant change with p<0.05. One variable BB/U (*WHZ Score)*does not show meaningful changing with a value of p>0.05. Similar research was done by Paramashanti et al, on children with low nutrition status. The intervention was education of development and nutrition, development stimulation, and it was successful in increasing the body weight and development significantly [28].

5. CONCLUSIONS

Intervention strategy of *Kader PendampingKeluargaKawalKaduta(KP-KKB)*as the supporting motor of Children Guidance Family is successful to show the better change of nutrition and development status than in the control group.The increase of a child's nutrition status is one of the main factors besides health factors in the child's optimal development. Parenting and stimulation become a very important thing to increase a child's growth and development.

Conflict of Interest

I hereby state that there is no necessary conflict in the process of writing this article and publication.

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SEPARATED TABLE

Table 1. Characteristic of research subject

Variable	Category	Intervention group n [%]	Control group n [%]	ρ value	
Age in months	- Adequate - Minimum - Maximum	12.3 5 19	12.6 7 20	0.83[a]	
	- 0-6 months - 7-12 months - 13-18 months - 19-24 months	3 [10.7] 11 [39.3] 12 [42.9] 2 [7.1]	0 [0.0] 13 [48.1] 13 [48.1] 1 [3.7]		
Gender	- Male - Female	16 [57.1] 12 [42.9]	18 [66.7] 9 [33.3]	0.38[b]	
Father's Education	- Not Graduate/Unfinished elementary school - Elementary school graduate - Junior high school graduate - Senior high school graduate	2 [7.1] 10 [35.7] 12 [42.9] 4 [14.3]	1 [3.7] 12 [44.4] 8 [29.6] 6 [22.2]	0.99[b]	
Mother's education	- Not Graduate /Unfinished elementary school - Elementary school graduate - Junior high school graduate - Senior high school graduate - University graduate	1 [3.6] 10 [35.7] 10 [35.7] 6 [21.4] 1 [3.6]	1 [3.7] 8 [29.6] 10 [37.0] 8 [29.6] 0 [0.0]	0.56[b]	
Father's job	- Private employee - Entrepreneur - Farmer - Labor/driver/home assistant - Others	3 [10.7] 9 [32.1] 10 [35.7] 5 [17.9] 1 [3.6]	4 [14.8] 6 [22.2] 7 [25.9] 9 [33.3] 1 [3.7]	0.55[b]	
Mother's job	- Unemployed - Entrepreneur - Farmer - Labor/driver/home assistant - Others	14 [50.0] 0 [0.0] 2 [7.1] 1 [3.6] 2 [7.1] 9 [32.1]	15 [55.5] 1 [3.7] 1 [3.7] 0 [0.0] 1 [3.7] 9 [33.3]	0.61[b]	
		N=28[100]	N=27[100]		

'a: Test meansthe difference between control and intervention groups with Independent t-test
'b: Test for different proportions between the control and intervention groups with chi-square

Table 2. Nutrition status and the development status of research subject in intervention and control group in the early study

Category	Intervention Group	Control Group	Total	ρ value
	n [%]	n [%]	N [%]	
Nutrition Status PB/U *[HAZ]*				0.95[b]
Very Short *[Z_Score <-3 SD]*	5 [17.9]	3 [11.1]	8 [14.5]	
Short *[Z_Score -3 SD s/d <-2SD]*	23 [82.1]	24 [88.9]	47 [85.5]	
Nutrition Status BB/TB *[WHZ]*				0.72[b]
Slim *[Z_Score -3 SD s/d <-2SD]*	1 [3.6]	1 [3.7]	2 [3.6]	
Normal *[Z_Score -2 s/d 2 SD]*	26 [92.8]	24 [88.9]	50 [90.9]	
Overweight *[Z_Score >2 SD]*	1 [3.6]	2 [7.4]	3 [5.5]	
Nutrition Status BB/U *[WAZ]*				0.93[b]
Bad *[Z_Score <-3 SD]*	1 [3.6]	0 [0.0]	1 [1.8]	
Deficient *[Z_Score <-3 SD]*	7 [25.0]	5 [18.5]	12 [21.8]	
Good *[Z_Score -2 s/d 2 SD]*	20 [71.4]	22 [81.5]	42 [76.4]	
Motor Development				0.46
Under average	8 [28.6]	12 [44.4]	20 [36.4]	
Normal	16 [57.1]	11 [40.7]	27 [49.1]	
Above average	4 [14.3]	4 [14.8]	8 [14.5]	
Language Development				0.48
Under average	9 [32.1]	4 [14.8]	13 [23.6]	
Normal	14 [50.0]	18 [66.7]	32 [58.2]	
Above average	5 [17.9]	5 [18.5]	10 [37.0]	
Personal Social Development				0.47
Under average	25 [89.3]	22 [81.5]	47 [85.5]	
Normal	3 [10.7]	5 [18.5]	8 [14.5]	
	n=28[100]	n=27[100]	N=55[100]	

b: Test for different proportions between the control and intervention groups with chi-square

Table 3. The change of nutrition status before and after getting intervention in the
intervention and control group

Intervention Group		Ending				
	Early	<-3 SD n [%]	-3 SD s/d <-2SD n [%]	-2 s/d 2 SD n [%]	>2 SD n [%]	N [%]
TB/U [HAZ]	<-3 SD	2 [50.0]	1 [25.0]	1 [25.0]	0 [0.0]	4 [100]
	-3 SD s/d <-2SD	1 [4.2]	6 [25.0]	17 [70.8]	0 [0.0]	24 [100]
BB/TB [WHZ]	<-3 SD	0 [0.0]	0 [0.0]	0 [0.0]	0 [0.0]	0 [0.0]
	-3 SD s/d <-2SD	0 [0.0]	1 [100]	0 [0.0]	0 [0.0]	1 [100]
	-2 s/d 2 SD	0 [0.0]	1 [4.0]	23 [92.0]	1 [4.0]	25 [100]
	>2 SD	0 [0.0]	0 [0.0]	1 [50.0]	1 [50.0]	2 [100]
BB/U [WAZ]	<-3 SD	0 [0.0]	0 [0.0]	1 [100]	0 [0.0]	0 [0.0]
	-3 SD s/d <-2SD	2 [33.3]	2 [33.3]	2 [33.3]	0 [0.0]	6 [100]
	-2 s/d 2 SD	0 [0.0]	1 [4.5]	21 [95.5]	0 [0.0]	22 [100]
Control Group						
TB/U [HAZ]	<-3 SD	0 [0,0]	2 [50.0]	2 [50]	0 [0.0]	4 [100]
	-3 SD s/d <-2SD	1 [4.3]	10 [43.5]	12 [52.2]	0 [0.0]	23 [100]
BB/TB [WHZ]	<-3 SD	0 [0.0]	0 [0.0]	0 [0.0]	0 [0.0]	0 [0.0]
	-3 SD s/d <-2SD	0 [0.0]	1 [100]	0 [0.0]	0 [0.0]	1 [100]
	-2 s/d 2 SD	0 [0.0]	2 [8.0]	23 [92.0]	0 [0.0]	25 [100]
	>2 SD	0 [0.0]	0 [0.0]	1 [100]	0 [0.0]	1 [100]
BB/U [WAZ]	<-3 SD	1 [100]	0 [0.0]	0 [0.0]	0 [0.0]	1 [100]
	-3 SD s/d <-2SD	0 [0.0]	4 [66.7]	2 [33.3]	0 [0.0]	6 [100]
	-2 s/d 2 SD	1 [5.0]	3 [15.0]	16 [80.0]	0 [0.0]	20 [100]

Table 4. The change of development status before and after getting an intervention in the intervention and control group

Intervention Group	Ending			
Early	Below average n [%]	Normal n [%]	Above average n [%]	N [%]
Motor development				
- Below average	2 [16.7]	9 [75.0]	1 [8.3]	12 [100]
- Normal	1 [8.3]	11 [91.7]	0 [0.0]	12 [100]
- Above average	0 [0.0]	3 [75.0]	1 [25.0]	4 [100]
Language development				
- Below average	1 [25.0]	3 [75.0]	0 [0.0]	4 [100]
- Normal	1 [5.3]	13 [68.4]	5 [26.3]	19[100]
- Above average	0 [0.0]	1 [20.0]	4 [90.0]	4 [100]
Personal social				
- Below average	10 [43.5]	13 [56.5]	0 [0.0]	23 [100]
- Normal	2 [40]	3 [60.0]	0 [0.0]	5 [100]
Control Group				
Motor development				
- Below average	1 [12.5]	4 [50.0]	3 [37.5]	8 [100]
- Normal	0 [0.0]	14 [93.3]	1 [6.7]	15 [100]
- Above average	1 [25.0]	3 [75.0]	0 [0.0]	4 [100]
Language development				
- Below average	0 [0.0]	6 [66.7]	3 [33.3]	9 [100]
- Normal	0 [0.0]	9 [68.2]	4 [30.8]	13 [100]
- Above average	0 [0.0]	1 [20.0]	4 [80.0]	4[100]
Personal social development				
- Below average	13 [54.2]	11 [45.8]	0 [0.0]	24 [100]
- Normal	0 [0.0]	3 [100.0]	0 [0.0]	3 [100.0]
- Above average	0 [0.0]	0 [0.0]	0 [0.0]	0 [0.0]

Table 5. The results of different tests on changes in nutritional status and development status between the intervention group and the control group

Category	Group	Change		
		Mean change	Sd	P value
TB/U *[HAZ]*	Intervention	0.65	1.21	0.001[a]
	Control	0.56	1.04	0.000[a]
BB/TB *[WHZ]*	Intervention	-0.51	0.85	0.004[b]
	Control	-0.75	0.93	0.000[b]
BB/U *[WAZ]*	Intervention	0.03	0.82	0.865[b]
	Control	-0.18	0.60	0.125[b]

Motor Development	Intervention	15.78	10.48	0.000[b]
	Control	12.18	9.57	0.000[b]
Language Development	Intervention	7,39	3.15	0.000[b]
	Control	9.29	3.89	0.000[b]
Personal Social Development	Intervention	10.32	4.10	0.000[b]
	Control	9.44	6.57	0.000[b]

aMean difference test in non-parametric paired samples [Wilcoxon]
bTest mean the difference in parametric paired samples [paired T-test]