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The Relationship between the Age of Menarche and Premarital Sexual Behaviors of Adolescence and Young Adults in Indonesia: Analysis on Survey Data of Indonesian Adolescents' Reproductive Health in 2012

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Abstract

One crucial period of woman's development period is when the age of puberty is begun, indicated by *menarche*. The age of *menarche* might be related to a certain sexual that one having earlier *menarche* is potential to do premarital sexual behaviors. The aim of this research is to analyze the relationship between the age of *menarche* and premarital sexual behaviors. This research is quantitative research employing secondary data: The Survey of Indonesian Adolescents' Reproductive Health (SKRRI, *Survey Kesehatan Reproduksi Remaja Indonesia*) in 2012. The data design hired was the cross sectional survey. Women at the age of 15-24 years-old were chosen as the research population. There were 7,367 samples involved, taken from both urban and rural areas. The dependent variable of this research was the premarital sexual behaviors categorized into non risky behaviors (holding hands) and risky behaviors (kissing, petting, and having sexual intercourse); while the independent variable was the age of *menarche*. The external variables of this research consisted of age, education, and domicile. This researcher used the univariable analysis, bivariable analysis utilizing the chi-square, and multivariable analysis applying the logistic regression with the confidence level of 95% and value of $p = 0.005$. The results show that the average age of *menarche* is thirteen years-old and premarital sexual behaviors are mostly performed by urban women. Based on the results of relationship test, the age of *menarche* does not have any significant relationship with premarital sexual behaviors. However, there is a significant relationship between premarital sexual behavior with the age and domicile.

Keywords: reproductive health, the age of *menarche*, sexual behavior

Introduction

Research Background

Puberty is a transition period between childhood and adulthood. The peak of puberty is indicated by *menarche* or the first menstruation undergone by an adolescent girl

(Mary & Carol, 2003). Earlier *menarche* that occurs when a child has not reached maturity of mind and still lacks of relevant knowledge causes various psychological responses to her.

The age of *menarche* is perceived as a crucial period since it is one indicator of reproductive health, population health, and future chronic disease (Islam *et al.*, 2017). The shift of age of *menarche* indicating earlier *menarche* becomes a wide concern since it happens in almost all of countries, including low and middle income countries (Blum *et al.*, 2014). This trends also sweeps Indonesia. The data of Riskesdas 2010 (*Riset Kesehatan Dasar*, Research of Fundamental Health) point out that as much as 40.7% and 32% adolescents had their *menarche* at the age of thirteen years-old and twelve years-old, respectively. Another research conducted by Suryansyah (2013) shows that adolescent begins their puberty at the age of nine to ten years-old (48.2%) and at the age of twelve to thirteen years-old, they all have had their puberty.

Research conducted by Yermachenko & Dvornyk (2014) indicates that early *menarche* triggers sexual behaviors and pregnancy in adolescent leading to early marriage. An adolescent with earlier *menarche* is potential for performing premarital sexual behaviors due to her emotional immaturity to control herself. Several studies figure out that those sexual behaviors are begun at the age of thirteen years-old. They include hugging, kissing, groping sensitive areas, and having sexual intercourse (Schwartz, 2010; Smith *et al.*, 2003).

In developed countries, the increase of prevalence of sexual activities among adolescents is shown by the number of girls in America having intercourses that increased from 7% in 1950 to 40% in 1982 (Brooks-Gunn & Furtstenberg Adolescent, 1989). A certain study in UK conducted in 1960s figures out that 12% of girls had had sexual intercourse. However, the study also reveals that ten years later, 50% of girls at the age of sixteen to nineteen years-old were reported for having lost their virginity (Farrel, 1978). Observed from the demography of adolescents, more than a half of sexually active adolescents (53.5%) live in rural areas and it is reported that they have more than one sexual partners (29.5%). In Indonesia, the data of Survey of Indonesian Adolescents' Reproductive Health in 2007 indicate that adolescents having premarital sexual intercourse were as much as 801 out of 18,510.

There are still limited literatures discussing the relationship between the age of *menarche* and sexual experiences in Indonesia. Research conducted by Deardoff *et al.*, (2005) reveals that there is indeed a relationship between sexual behaviors and the age of *menarche*. However, that research uses relatively small sample and is European-countries based. Hence, this research was purposively designed to observe the relationship between the age of *menarche* and specific sexual experiences; such as holding hands, kissing, petting, and having sexual intercourse on adolescents and young adults in Indonesia by employing the data of Survey of Indonesian Adolescents' Reproductive Health.

Research Objectives

To observe and analyze the relationship between the age of *menarche* and sexual behaviors on adolescents and young adults.

Methodology

This research is cross sectional study research hiring the data of Indonesian Demographic Health Survey (SDKI, *Survey Demografis Kesehatan Indonesia*) in 2012 containing the data of sub-survey of Reproductive Health of Adolescents with the population of all adolescents and young adults at the age of 15-24 years-old in Indonesia. The researcher applied the cross sectional study design to analyze the relationship between determining factors and their effects by using the observational approach or gathering data in a certain place (Rosner, 2010). This research involved respondents of Indonesian Demographic Health Survey in 2012 that were 8,902 girls. Those girls were selected based on inclusion criteria: female and having had *menarche*. Exclusion criteria of this research were respondents with 'not knowing' answers on questions related to the research variables. Those both criteria minimized the sample to be 7,367.

The dependent variable in this research was the premarital sexual behaviors categorized into non risky behaviors (holding hands) and risky behaviors (kissing, petting, and having sexual intercourse); while the independent variable was the age of *menarche*. The external variables of this research were age, education, and domicile. The univariable analysis was conducted by finding the distribution of respondents' characteristics, performed by observing the distribution of frequency and the proportion of each group. The bivariable analysis was conducted by utilizing the chi square to figure out the relationship between the dependent and the independent variables as well as between the external and the dependent variables. The influence of independent variables towards the dependent variables involving external variable was found out by performing the multivariable analysis by hiring the logistic regression with the confidence level of 95% and the value of $p = 0.0005$.

Findings

Table 1 displays the chosen sample has a double proportion for the adolescent age (66.96%), larger than the proportion for the young adult age that is 33.04%. The biggest proportion of education level is reached by the respondents graduating from senior high school (51.57%); while the respondents graduating from tertiary schools (university/academy) have a proportion as much as 26.17%. The selected respondents mostly come from urban areas.

Table 1 The Distribution of Respondents' Characteristics

Variable	n	%
Age		
Adolescent (15-19 years-old)	4,933	66.96
Young adult (20-24 years-old)	2,434	33.04
Education		
Primary school	492	6.68
Junior high school	1,369	18.58
Senior high school	3,799	51.57
Tertiary education	1,707	26.17
Domicile		
Urban	4,523	61.40
Rural	2,844	38.60
The age of <i>menarche</i>		
<12 years-old	479	6.50
12-14 years-old	5,460	74.11
>14 years-old	1,428	19.38
Sexual behaviors		
Risk	4,836	34.36
Non risk	2,531	65.64

The age of *menarche* is when a woman has her first menstruation. The respondents' age of *menarche* involved in the research ranges from nine to twenty years-old. They had their *menarche* at the age of thirteen years-old on average. The largest proportion of age of women having their *menarche* is at the age of twelve to fourteen years-old (74.11%). There are only 6.50% women having their *menarche* at the age of less than twelve years-old.

Based on the Central Agency of Statistics (BPS, *Badan Pusat Statistik*) in 2012, sexual behaviors consist of dating behavior including holding hands, kissing, petting, and having coitus. In this research, sexual behaviors are divided into the risky and non risky sexual behaviors. A sexual behavior is categorized as risky if in the forms of kissing, petting, and/or having coitus and non risky if there are no kissing, petting, and having coitus. Table 2 indicates that one third of respondents have conducted risky and non risky premarital sexual behaviors.

Table 2 The Distribution of Risky and Non-Risky Premarital Sexual Behaviors

Variable	Safe		Unsafe/Risky		P-value
	n	%	n	%	
Age					
Teenage (15-19 years-old)	3,554	73.49	1,379	54.48	0.000
Young adult (20-24 years-old)	1,282	26.51	1,152	45.52	
Education					
Primary school	326	6.74	166	6.56	0.000
Junior high school	994	20.55	375	14.82	

Variable	Safe		Unsafe/Risky		P-value
	n	%	n	%	
Senior high school	2,567	53.08	1,232	48.68	
Tertiary education	949	19.62	758	29.95	
Domicile					
Urban	2,004	41.44	840	33.19	0.000
Rural	2,832	58.56	1,691	66.81	
The age of <i>menarche</i>					
<12 years-old	314	65.55	165	34.45	0.227
12-14 years-old	3,612	66.15	1,848	33.85	
>14 years-old	910	63.73	518	36.27	

A double distribution of experiences in performing risky premarital sexual behaviors is found on adult women (32.67%) if compared to distribution found on adolescent girls (15.29%). A high distribution of experiences in performing risky premarital sexual behaviors is also discovered on the respondents whose education level is senior high school (48.68%). The percentage of risky sexual behavior increases along with the higher level of education yet it decreases when the respondents have a high education. Furthermore, the high percentage is also found on adolescents and young adult women living in urban areas (66.81%). During the age of *menarche*, women with earlier *menarche* (less than twelve years-old) and late *menarche* (more than fourteen years-old) possess a bigger proportion of conducting risky sexual behaviors.

To figure out factors triggering adolescents to perform risky and non risky sexual behaviors, the researcher conducted a further test that was the logistic regression by involving all variables, either independent or external variables. The test resulted p-value (Prob > chi²) as much as 0.03 that meant there were significant influences of independent variables towards the dependent variables.

Table 3 Odd Ratio, Confident Interval, and P-value of Sexual Behaviors

Variables	Risky Sexual Behaviours			P-value
	OR	95% CI		
Age				
Adolescent (15-19 years-old)	Ref			
Young adult (20-24 years-old)	2.130674	1.894858	2.395838	0.000
Education				
Primary school	Ref			
Junior high school	.8578326	0.6835969	1.076478	0.186
Senior high school	1.021387	0.8322406	1.253521	0.840
Tertiary education	1.09334	0.8769863	1.363068	0.428
Domicile				
Urban	Ref			
Rural	1.250736	1.125762	1.389584	0.000
The age of <i>menarche</i>				
<12 years-old	Ref			

12-14 years-old	.9484679	.776107	1.159107	0.605
>14 years-old	0.7125685	.7568347	1.181928	0.624

After involving all variables, the result of logistic regression indicates that only the variables of age and domicile that significantly influence risky sexual behaviors. The values of Odds Ratio as much as 2.51 and CI (1.894858-2.395838) point out that adult women are more prone to conduct risky sexual behaviors 2.1 times if compared to teenage girls. In the variable of domicile, the value of Odds Ratio is 1.2, showing that adolescents and young adults living in urban areas possess 1.2-times potentiality to do riskpremarital sexual behaviors. Moreover, the variables of education, domicile, and age of *menarche* indicate no significant relationship. This test publishes similar results to results of bivariate test where only the variables of age and domicile that show a significant relationship.

Discussion

Entering the age of puberty indicated by the age of *menarche* is a woman's critical period. The age of *menarche* has been widely perceived as one of indicators determining the reproductive health of all ages. The results of research suggest that the average age of *menarche* is thirteen years-old, either in urban or rural areas. Those results are similar to results of research conducted by Suryansyah (2013) concluding that all teenage girls in urban areas have had their puberty indicated by having *menarche* at the age of twelve to thirteen years old. Affandi, B. (1991), quoted by Soejoeti (2001) conveys that one hundred years ago, there was a woman having her first period at the age of seventeen years-old. Nowadays, a teenage girl has her first period at the age of twelve years-old or maybe less due to relatively improved nutrition and stimulations of visual and audio media (radio, TV, movies, and magazines) that accelerate biological maturity.

This research figures out that the number of adolescents and young adults conducting risksexual behaviors is less than the number of adolescents and young adults that do not conduct sexual behaviors. One out of three women of this research has performed risky sexual behaviors. This is due to the fact that premarital sexual intercourses are not supported by Indonesian cultures.

In line with the research conducted by Pinandari (2015) stating that premarital sexual behaviors are more frequently found in urban than rural areas, this research indicates that women whose domicile is in urban areas perform more sexual behaviors than women in rural areas. Age possesses a significant influence towards sexual behaviors. Adults conduct more sexual behaviors than adolescents since they have more experiences.

The researcher did not find any significant relationship between education and risky sexual behaviors. Pinandari (2015) finds out that in Indonesia, either adolescents or young adults do not accept any formal education related to reproductive health; they

only have information of contraception methods. Hence, either women with low or high education have the same possibility in performing risky sexual behaviors.

This research also shows that the age of *menarche* does not significantly influence sexual behaviors. Nevertheless, women with early *menarche* and women with late *menarche* are more potential to conduct risky sexual behaviors if compared to women with average or normal *menarche*. Irwin and Millstein (1998) believe that adolescents' risky behaviors are the manifestation of asynchronous pubertal maturation or too early/late maturity. This triggers them to perform risky behaviors; such as consuming alcohols and drugs as well as having premarital sexual intercourses.

Conclusion

This research concludes that the average age of *menarche* is thirteen years-old and that risky behaviors have less proportion when compared to risky sexual behaviors. Women living in urban areas are more potential in having risky behaviors. There is no significant relationship between the age of *menarche* and risky sexual behaviors, respectively. Young adult women living in urban areas tend to do more risky premarital sexual behaviors than adolescent girls living in rural areas.

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Carotid Atherosclerosis and Lacunar Stroke a Possible Association

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Abstract

Stroke remain the third cause of death and a major cause of disability worldwide. Our modern time enemy, atherosclerosis, with his many faces, is strongly related with stroke and its major subtypes. Ischemic stroke account up to 80 % of all stroke. As a subtype of ischemic stroke, lacunar infarcts remain an important concern. Aim of this study is to correlate carotid disease findings with lacunar stroke. We studied a group of 129 patients with carotid disease, and we established a possible relationship with lacunar stroke. Ultrasonography findings were correlated with the presence of lacunar stroke, confirmed by CT scan. Our study demonstrate that carotid plaques number could be a good predictor for lacunar stroke risk. External carotid plaques number is strongly correlate with lacunar stroke presence.

Keywords: atherosclerosis, plaques, carotid tree, lacunar stroke.

1. Introduction

In 1960, Miller Fisher redefined lacunas as “small, deep cerebral infarcts” due to occlusion of a single perforating vessel [1]. He coined the term “lipohyalinosis” for the segmental arterial pathology that affects small penetrating arteries and causes lacunar infarcts. He also showed that atherosclerosis of the origins of penetrating

arteries, “micro atheroma,” is a frequent cause of lacunar infarcts [1]. However, it is known that lacunar infarcts may be due to other causes like large arteries disease or even cardio embolic disease. Lacunar infarcts has an incidence comparable with the incidence of large vessel atherosclerotic stroke (25/100.000). Lacunar strokes, and more often so called lacunar state is strongly relying with dementia and poor quality of life. Lacunar strokes account up to 15 -20 % for all strokes [2].

2. Material and Method

We investigated the relation between carotid disease pattern and lacunar stroke for 129 patients in our department. The study was a prospective one, with a follow-up time of one year. All patients signed an informed consent when enrolled.

Carotid ultrasound was performed at the initial visit. The assessment of carotid disease was done by ultrasound and Duplex examinations according to the protocol, with high resolution B mode, color Doppler and pulse Doppler. We measured IMT index (mean after three points examination at 1 cm below bifurcation of both common carotid arteries) and we assessed the presence and the number of plaques. There were designated as focal intima-media thickening greater than 1.3 mm.

We performed ultrasonography examinations with an ultrasound scanner (Philips HD 15) equipped with a 7.5MHz linear array transducer.

The assessment by CT scan was done by using native craniocerebral examination, performed with multislice CT scanner. Lacunar stroke confirmed by CT scan was mandatory for a patient to be included in the lacunar stroke group.

AS exclusion criteria, we excluded other causes of ischemic stroke as dissections, vasculopathy, Takayasu disease, cardio-embolic strokes and TIA, due to heterogeneity of symptoms and causes. We excluded a priori all intracerebral hemorrhages and large strokes.

According to the number of plaques at each evaluated level, we divided patients into two groups. First group consisted of patients with maximum two plaques and the second group patients with three or more plaques.

For the evaluation of the Intima-Media Thickness (IMT) we considered values higher than 0.9 as being abnormal.

To test the association between plaques number and lacunar stroke we used Fisher's Exact Test. For comparing continuous variables, we tested the normality of the distribution using Shapiro-Wilk test. If the distribution didn't differ significantly from a normal one we continued by using parametric tests and in the case the distribution differed in a significant way, we used non-parametric alternatives

3. Results and Discussions

From the total of 129 patients included in this study, 17 of them were diagnosed with lacunar stroke (see **Error! Reference source not found.**).



Fig. 1 Proportion of patients with lacunar stroke

According to the sex of the patients, 72 (55.8%) were women and 57 (44.2%) males (see **Error! Reference source not found.**).

Fig. 2 Distribution according to sex

The percentage of men with lacunar stroke is statistically significant ($p=0.034$) higher compared to the females (19% vs 7.5%). The odds ratio is 3.573 (95% CI 1.178 – 10.838), the risk being higher for men (see Figure 3).

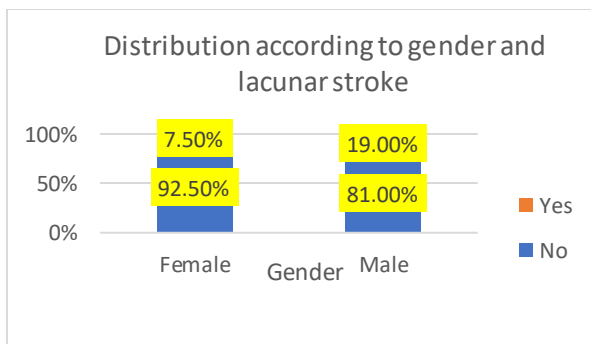


Fig.3 Distribution according to sex

The average age for the patients without lacunar stroke is 62.53 years (SD 11.90) and a median of 63 years. For the group of patients with lacunar stroke, the average and the median age are higher, with values of 69.41 years (SD 8) and a median of 70 (**Error! Reference source not found.**). The difference is statistically significant (U=604, z=-2.425, p=0.015).

Table 1 Descriptive analysis for the age

Lacunar Stroke	No.	Mean	Std. Deviation	Median	Minimum	Maximum
No	112	62.53	11.903	63.00	24	86
Yes	17	69.41	8.000	70.00	51	79
Total	129	63.43	11.677	64.00	24	86

3.1. Intima-Media Thickness

In the group of patients without lacunar stroke, 65.2% have normal IMT, while in the group of patients with lacunar stroke the percentage is 70.6% (**Error! Reference source not found.**). The difference is not statistically significant (p=0.787).

Table 2 IMT distribution for the two groups

IMT Group * Lacunar Stroke Cross tabulation					
		Lacunar Stroke			Total
		No.	Yes		
IMT Group	Normal	Count	73	12	85
		% within Lacunar Stroke	65.2%	70.6%	65.9%
	Abnormal	Count	39	5	44
		% within Lacunar Stroke	34.8%	29.4%	34.1%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

Further, we analyzed the IMT values, comparing them among the two groups. The purpose is to see if patients with lacunar stroke have higher values of IMT compared to patients without lacunar stroke (**Error! Reference source not found.**), even though as proportion of normal/abnormal values there are no differences. In this case we also found no statistically significant difference (U=930, z=0.181, p=0.856).

Table 3 IMT Descriptive statistics

Lacunar Stroke	No.	Mean	Std. Deviation	Median	Minimum	Maximum
No	112	1.264	.6412	.900	.9	4.0
Yes	17	1.306	.7537	.900	.9	3.5
Total	129	1.270	.6540	.900	.9	4.0

3.2 The Presence of Atheroma Plaques or Atheromatosis Modifications

The presence of atheroma plaques or atheromatosis modification have a higher percentage in the lacunar stroke group. Almost 95% of the patients with lacunar stroke have this modification, while for the no-lacunar stroke group these appear in 71.4% of the investigated patients (**Error! Reference source not found.**). The difference is not statistically significant ($p=0.07$).

Table 4 Cross tabulation Lacunar Stroke - Presence of atheroma plaques/atheromatosis modifications

			Lacunar Stroke		Total
			No	Yes	
Presence of atheroma plaques/atheromatosis modifications	No	Count	32	1	33
		% within Lacunar Stroke	28.6%	5.9%	25.6%
	Yes	Count	80	16	96
		% within Lacunar Stroke	71.4%	94.1%	74.4%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

3.3. Plaques Number Pre Bulbar Level

Analyzing the number of plaques at pre bulbar level, 17.6% of the patients with lacunar stroke presented three or more plaques, while in the group of patients without lacunar stroke the percentage was 12.5% (**Error! Reference source not found.**). The difference is not statistically significant, $p=0.669$, thus we concluded that the presence of three or more plaques is not associated with an increased risk of lacunar stroke.

Table 5 Cross tabulation Lacunar Stroke - Plaques number at pre bulbar segment level

			Lacunar Stroke		Total
			No	Yes	
Plaques number at pre bulbar segment level	<=2	Count	98	14	112
		% within Lacunar Stroke	87.5%	82.4%	86.8%
	3+	Count	14	3	17
		% within Lacunar Stroke	12.5%	17.6%	13.2%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

3.4. Plaques Number Carotidal Bulb Level

More than 70% of the patients present three or more plaques at carotidal bulb level, compared with a significantly lower percentage for the patients without lacunar stroke (38.4%) (**Error! Reference source not found.**). The difference is statistically significant ($p=0.017$), fact that sustains the idea that a higher number of atheroma

plaques at bulbar level is associated with an increased risk of lacunar stroke. The odds ratio is 3.85 (95% CI 1.27 – 11.69).

Table 6 Cross tabulation Lacunar Stroke – Plaques number at carotid bulb level

			Lacunar Stroke		Total
			No	Yes	
Plaques number at carotid bulb level	<=2	Count	69	5	74
		% within Lacunar Stroke	61.6%	29.4%	57.4%
	3+	Count	43	12	55
		% within Lacunar Stroke	38.4%	70.6%	42.6%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

3.5. Plaques Number at External Carotid Artery Level

Further we examined the influence of atheroma plaques at external carotid artery level. Almost 60% of the patients with lacunar stroke had three or more plaques at ECA level. For the group of patients without lacunar stroke, the percentage of patients with three or more plaques is significantly lower (22.3%) (**Error! Reference source not found.**). This result sustains the idea that there is a statistically significant (0.003) association between number of plaques at ECA level and the development of lacunar stroke. The odds ratio is 4.97 (CI 95% 1.72 – 14.39).

Table 7 Cross tabulation Lacunar Stroke – Plaques number at External Carotid Artery level

			Lacunar Stroke		Total
			No	Yes	
ECA	<=2	Count	87	7	94
		% within Lacunar Stroke	77.7%	41.2%	72.9%
	3+	Count	25	10	35
		% within Lacunar Stroke	22.3%	58.8%	27.1%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

3.6. Plaques Number at Internal Carotid Artery Level

In the case of atheroma plaques identified at the internal carotid artery level, almost two thirds of the patients with lacunar stroke (64,7 %) present three or more plaques. By comparison, in the group of patients without lacunar stroke the percentage of patients with three or more plaques is 37.5%. (**Error! Reference source not found.**) Using the Fisher Exact test, the result is not statistically significant (p=0.06), thus the number of plaques at ICA level can be considered not to be associated with lacunar stroke. This p value obtained is, at the same time, very close to the point of rejecting the null hypothesis and it is known that Fisher exact test is more conservative.

The odds ratio is 3.06 (CI 95% 1.05 – 8.87), identifying a higher risk of lacunar stroke for patients with three or more plaques at the ICA level.

Table 8 Cross tabulation Lacunar Stroke – Plaques number at internal carotid artery level

			Lacunar Stroke		Total
			No	Yes	
ICA	<=2	Count	70	6	76
		% within Lacunar Stroke	62.5%	35.3%	58.9%
	3+	Count	42	11	53
		% within Lacunar Stroke	37.5%	64.7%	41.1%
Total		Count	112	17	129
		% within Lacunar Stroke	100.0%	100.0%	100.0%

4. Conclusions

In our study, we found that men are at higher risk for lacunar infarcts than women, and this was the same in literature [3]. Stroke are the fourth leading cause of death in men, so we have to take care about it. After all, stroke remains the major cause of disability in the worldwide [4]. Women and men with stroke also differ in their risk factor profiles, and they respond differently to primary-prevention and acute stroke treatment. Women experience variations in endogenous estrogens throughout their life cycle and might also be exposed to exogenous estrogens, both of which markedly affect the brain.

Measurement of intima-media thickness is a marker of atherosclerosis. Increases in IMT thickness have been associated with involvement of other arterial beds with atherosclerosis and an increased risk of stroke in adults. However, there is only a little knowledge concerning the relationship between IMT and subtypes of brain infarction. Recently, it has been observed that an increased IMT was associated with brain infarctions both overall and in the main subtypes [5].

Our study found no statistical correlation between IMT thickness and lacunar stroke risk, whereas Touboul et al observed a slight but significantly higher IMT even in lacunar infarcts compared with control subjects. The difference of our population study is coming from the fact that our patients were patients with first stroke or stroke like suspicion.

Unlike other types of ischemia such as cortical infarctions in which the relationship with atherosclerotic extracranial lesions is well established, the question of whether the occlusion of a perforating artery by mechanisms related to atherosclerotic extracranial lesions can result in a lacunar stroke is controversial.

Fisher, the creator of the “lacunar hypothesis,” observed in some postmortem examinations that it was not possible to explain all lacunar stroke as secondary to specific disease of the perforating vessel and assumed that the cases in which no

histological abnormality was identified in the perforating artery could indicate that the occlusion depended on embolic mechanisms [6].

Carotid plaques increase the risk of stroke, and this is a statement. However, in our study, atheromatosis changes are not significant statistically associated with lacunar infarction.

As for presence of the plaques in common carotid artery level, we found out that more than three plaques are more likely to be associated with lacunar stroke but it was not statistically significant. Carotid plaques increase the risk of stroke and cerebral infarction, irrespective of their location (Hollander and all). It is likely that carotid plaques in neurologically asymptomatic subjects are both markers of generalized atherosclerosis and sources of thromboembolic.

As for carotid bulb level, we found out that higher number of plaques at this level, is strongly associated with lacunar stroke risk, independently of carotid stenosis or aspects of plaques. Also more than 3 plaques in distal carotid arteries are strongly related with lacunar stroke.

A big surprise in our study was the correlations between number of plaques in external carotid arteries are strongly related with lacunar stroke risk. Few articles are about external carotid arteries disease importance in stroke relationship. In fact, many clinicians paid no attention for external carotid arteries disease, and the real importance is not established. We found out that major's studies were not taken into account this Cerebral Arteries of carotid tree.

The ECA is an important collateral pathway in patients with ipsilateral ICA occlusion and recurrent symptoms; this may influence the surgical decisions involving revascularization of the stenotic ECA. ECA stenosis may not be clinically significant, with no need to change patient care [7]. However, the external carotid arteries disease is an important predictor for lacunar stroke in our study, and perhaps of generalized atherosclerosis.

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Identity Narrative as an Unconscious Scaffold for Human Autobiography

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Abstract

Over the past years, a multi-disciplinary literature on the significance of personal narratives in autobiography and identity has emerged. This subject has been of interest to authors in the fields of humanities, psychology, and medicine alike. In this paper, we are proposing the term Identity Narrative (IdN) to define a cognitive and emotional framework that serves as an implicit (unconscious) scaffolding of memory on which to build human autobiography. The authors first classify narratives into external (universal history, the humanities, culture) and internal (autobiography, based on personal experiences, both directly and indirectly, through identification and education). All philosophy and social commentary has utilized history for the purposes of prediction and meaning-making. Personalities including Aristotle, St. Augustine, Rousseau, Freud, Marx, Spengler, and Benjamin Franklin have reread history to gain insight about human nature. History has inspired the enlightenment and renaissance of a new reality for humanity. It is widely known that history can also be misused to justify aggression and human suffering. The use of history to create deep convictions that annihilate moral imperatives is only possible because of unconsciously consolidated internal narratives, the IdN. IdN is reshaped through life, both by “bottom-up” acquisition of information, as well as a “top-down” learning model, which includes the following circumstances: (a) sudden insight and awareness; (b) experiences with high emotional valence; (c) high frequency of repetition; and (d) prolonged duration of exposure. In this way, IdN, a form of relatively stable

unconscious, anoetic memory, provides a “first-person” experience to autobiography. Autobiography then, becomes part of auto-noetic consciousness, the human ability to mentally time travel and have self-knowledge. IdN parallels lifelong growth and development, language acquisition, and maturing of attachment. The extensive brain activation during communication and speech, revealed by neuroimaging studies, will be referred to as the “communication beltway.” We hypothesize that the alternation in activation between the default mode (midline structures) of the brain (previously associated with the Self) and the language brain creates a platform that encodes crucial components of IdN throughout life. In this way, IdN, autobiographical memory, and the language brain are parts of a larger biological substrate of social affiliations.

Keywords: identity, narrative, unconscious, scaffold, human, autobiography

Introduction

Narrative Identity and Identity Narrative (IdN)

Human consciousness is linked to our capacity to keep history. Our ability and need to keep a timeline between past, present, and future necessitates the creation of stories and human history¹. Indeed, human history starts with telling of stories and fairytales. In some languages the word for the field of history and the word for story are interchangeable [“Geschichte” (Ger.), “L’histoire” (Fr.)]. Through stories, all cultures provide a narrative for the origin of the world (Eliade, 1998).

The word Narrative comes from “gna” (Sanskrit) meaning knowledge, “gnarus” (Latin) and “narrare” (Latin) meaning to tell (Abbott, 2002).^[1] Contributions over the past century have pointed to the significance of a person’s narrative in creating a cohesive personal history. The term *Narrative identity* is commonly associated with the work of French philosopher, Paul Ricoeur, referring to the life story that an individual develops consciously by creating an integration of life events into a coherent narrative. In more clinical contexts, narrative identity is a part of a conscious autobiographical integration of life events. We are proposing the new term “Identity Narrative” (“IdN”) to refer to an implicit unconscious type of memory that serves as support for identity and the self.

Identity Narrative and Autobiographical Memory:

Squire (1995) distinguished between declarative (conscious recollection) and non-declarative (without conscious sense of “pastness”) memory. Non-declarative, or implicit memory, has been traditionally associated with “habit” or procedural, automatic tasks. Tulving’s contributions (1972, 2002) on memory have delineated the

¹ Keeping a timeline is specific to auto-noetic consciousness of Homo sapiens sapiens (Leffert, 2018).

differences between declarative semantic memories (facts) and declarative episodic memories (events). A subtype of episodic memories is the autobiographical memory (AM). Autobiographical memory gradually develops during preschool years. There is a large body of developmental, clinical, and theoretical literature on AM. Autobiographical memory is seen as a quintessential attribute that provides identity to a person. However, from a neurobiological point of view, AM as a subtype of memory of personal events alone, could hardly fulfill its function of maintaining personality stability and predictability. Curiously, little has been written about the role of procedural memory in maintaining personality stability.

We propose that Identity Narrative (“IdN”), as a dimension of procedural memory, a form of the unconscious, consists of encoded information of a variety of origins, which are gradually retained as implicit (procedural) memories. IdN provides AM with implicitly encoded, predictable patterns of reactions to the environment which first develop in a dyadic relationship with caregivers. IdN is most actively developed during the preschool years, beginning with the time of the childhood amnesia but continues to expand and reshape throughout life.

We propose that IdN is a contemporary form of the unconscious. Seen in this context, the unconscious has a very specific evolutionary role. As a form of procedural memory linked to autobiography, it allows for the “anoetic” consciousness, which creates a profound and constant presence of “who we are.” IdN creates an early narrative, “a way of being,” rather than “a way of remembering.” “A way of being” is created by parental interactions, attachment, cultural environments, and life experience. In addition, temperamental factors and epigenetics may have a significant role in shaping IdN (Novac et al, 2017).

Thus seen in this context, the unconscious is charged with background constancy that, for better or for worse, provides an intergenerational and culturally cohesive role. This is supported by evidence that life-events, especially interactive experiences from ages 0 to 3, which an individual has no explicit memory of, are stored and influence a person’s development and future personality (Kernberg, 2015). Unlike pure autobiography and self-awareness, IdN, as part of anoetic consciousness, is present in vertebrate animals (Panksepp, 1998).

In humans, IdN stores a set of implicit memories prior to the emergence of autobiographical memory during ages three to five. The early “uploads” of IdN components serve as a basic framework, a permanent unconscious scaffolding for the further acquisition of autobiographical memories and the conscious autobiographical self. Throughout life, IdN continues to be reshaped by life events (Novac, Bota, & Blinder, 2017). There seems to be an ongoing reciprocal exchange between the unconscious IdN and AM. Previous work has indicated that the function of the “self” is associated with activation of midline brain structures (Panksepp & Northoff, 2009). In addition we have proposed the term “Communication beltway” for the extensive bilateral brain stimulation during interactive speech (Novac & Bota, 2014). We have

hypothesized that the alternation in activation between the default mode (midline structures) of the brain and the “Communication beltway” creates a neurobiological platform that encodes crucial components of IdN throughout life. In a previous contribution, we also proposed that throughout life, the reshaping of IdN occurs through a variety of mechanisms, depending on social circumstances: (a) sudden insight and awareness of a specific important life event and/or self-awareness (the “Eureka” moment); (b) any experiences with high emotional valence, as catecholamines secreted during emotional moments have a memory consolidating effect (McGaugh, 1983); (c) high frequency of repetition; and (d) prolonged duration of exposure (like the years spent in formalized education which shape identity) (Novac, Tuttle, Bota, Yau, & Blinder, 2017).

As IdN operates at an unconscious level, it encompasses a large number of functions, including: attachment, interactive restoration, acquisition of traits, reshaping of reactivity, etc. It also provides a stabilizing effect on autobiographical memory. In order to do so, it has to undergo a continuous *adaptive* process. Biologically, adaptation encompasses two separate components: *mutation* and *selection*. By means of mutation, new traits or structural components are created in time. These are all “developmental opportunities.” Through the process of selection, as time passes, only the most functionally useful “opportunities” are maintained. The unused components are gradually eliminated. Prior contributions that cover the unconscious hardly considered mutation and selection as active mechanisms. IdN, as a form of the unconscious memory, may undergo a continuous process of adaptation through active mutation and selection. This occurs through two major mechanisms: a “bottom-up” and “top-down.”

A. The Bottom-Up Mechanism:

Preverbally, IdN incorporates the previously described match/mismatch/repair paradigm during mother/infant interaction (Cavelzani & Tronick, 2016). This incorporation into the unconscious IdN mirrors the “predictive cycle” paradigm of procedural learning (Tadlock, 2005). This early implicit information becomes part of anoetic consciousness. Thus early acquisitions of IdN remain unconscious and are the basis of automatic associations and actions, with little access to awareness.

B. The Top-Down Mechanism:

After verbal acquisition, IdN also includes the acquisition of self-related skills (within the “acquisition of skills” paradigm of procedural learning) (Fitts, 1954), which is dominant throughout life. Through the “acquisition of skills” implicit (procedural) learning paradigm, newly acquired conscious, explicit memories of life events are incorporated into the unconscious, implicit memory pool, e.g. the IdN.

Functionally, the main role of IdN is the organization and holding of conscious autobiographical information. Its priority is autobiographical information-storage and retrieval in a *predictable and consistent* manner, to create stability of personality.

It also allows for the storing of autobiography in the form of a meaningful “logical story,” a narrative. IdN provides a personal point of reference toward that narrative, common sense, and meaning for any story. Yet, IdN is unconscious.

IdN provides a variety of psychodynamic functions including defense mechanisms (against anxiety and panic). It facilitates attachment and thus allows for the expansion of personal development, social bonds, cohesion and communal kinship, which all promote survival.

Childhood amnesia, the first three to five years of life, for which most of people have little or no recollection, is the period during which IdN is formed and built through a gradual acquisition of implicit, experiential memories. Processes that occur during childhood amnesia do influence the emergence of autobiographical memory (Nelson & Fivush, 2004).

In a previous contribution (Novac, et al., 2017b), we proposed the coordinates of IdN and its functions in relation to childhood amnesia. While IdN (the unconscious) is anoetic, it makes the acquisition of the features of autobiography, and its auto-noetic conscious, possible: “Remembering that it happened to me,” the auto-noetic experience (Tulving, 2002); the linking of past experiences to the present; the ability to “own” the changes in one’s own self (McLean, Pasupathi, & Pals, 2007); the ability to create a personal timeline and observe an organized manner in creating a personal chronology (Habermas, 2007; Habermas & Bluck, 2000).¹

The Relevance of Narrative Identity:

Phenomenologist, Paul Ricoeur’s extensive contribution on “Narrative Identity” constitutes fundamental knowledge for the study of autobiography. Consciously, a stable life narrative identity seems to emerge around adolescence (McLean, 2005; McLean & Breen, 2009).

Narrative Identity research elicits personal narrative from subjects that code the stories in areas such as redemption, contamination, communion, agency, etc. (McAdams, D, 2001). The function of meaning-making is particularly valuable in psychological healing and trauma recovery (Pennebaker, 1993, 2000). Narrative Identity with its coherent memory of one’s past is also crucial in the mechanism of constructing a coherent autobiography (Habermas & Bluck, 2000). In this sense, Narrative Identity is the organized conscious and functional component of a person’s autobiography.

Paul Ricoeur pointed to the fact that humans tend to draw past events together into a meaningful narrative, a process he called “emplotment.” To Ricoeur, attribution of causation, and explanation of one’s personal past, stands as the basis for moral responsibility. Therefore, narrative and by implication, Narrative Identity, are parts of establishing a moral universe. In Ricoeur’s analysis, Narrative Identity is closely

¹ The timeline may be part of an implicit organization of IdN.

linked to the concept of time. Ricoeur recognizes a “prenarrative level of understanding referred to as “prefiguration.” He posits that the prearrative level of understanding stems from the fact that an individual consciousness is inhabited by its culture as a “symbolic whole.” (Ricoeur, 1975, 1978 1984, 1985, 1988). Regarding the future, “inchoate narrativity” integrates life events into potential narrative that creates a potential for action and decision-making. This creates a meaning for the future and the possibility of choice-making.

We are proposing the term Identity Narrative (IdN) to designate the implicit (unconscious) memory component that supports and creates a relative stability for conscious autobiographical narrative identity. In this sense, Narrative Identity and our new concept of IdN are distinct, yet closely linked.

Differences Between Narrative Identity and Identity Narrative (IdN):

Here we are presenting a broad delineation of the difference between these two concepts.

Narrative Identity is one’s consciously recalled and reprocessed life story: a part of autobiography. IdN is unconscious. There is evidence that its roots begin prenatally and develop before verbal acquisition.

Narrative Identity is structurally linked to time, cause and effect, and coherence. IdN tends to be timeless, may not follow cause and effect logic, and includes primary process thinking.

Narrative Identity has an ego-sustaining effect and explicitly defines the self in relation to others. It facilitates self-examination. IdN arises out of early dyadic relationships, evolutionarily meant to have reparative functions. It molds itself by virtue of the nature of infant-caregiver interactions. IdN is a form of the unconscious with an implicit record of interactive experiences. Alternatively, it may incorporate dysfunctional interactions which shape the developing self.

Narrative Identity also includes at a basic stage a “pre-narrative” level of understanding (“pre-figuration”) which stems from consciousness being inhabited by culture as a “symbolic whole.” IdN focuses entirely on a social, interactive “pre-narrative” aspect. It is unconscious and includes elaborate components with a role in non-verbal communication, trauma-reparative resiliency, and therefore, has a crucially stabilizing effect for autobiography. This has not been previously covered by the literature on narrative identity.

Narrative Identity is a human attribute related to the cultural environment. IdN is a neurobiological and clinical concept related to non-declarative (unconscious) memory and anoetic consciousness. It is present to different degrees in evolved animals. It is linked to the evolution of the brain.

Ricoeur’s concept of “pre-narrative” presents many similar features to IdN. The “pre-narrative” and the IdN, with their underlying deep predisposition to grasping and

acquisition of specific new information, both evoke Chomsky's "deep structure" for acquisition of human language (Chomsky, 1965)).

In conclusion, in our view, Narrative Identity is based on the inherent human drive to cultivate auto-noetic consciousness through narratives (stories), both on cultural and personal levels. IdN, with its early structuring function stemming from implicit memory consolidation, provides a relative stability to an individual's Narrative Identity and the autobiographical self. From a clinical point of view, the term autobiographical memory is preferred. From a philosophical point of view, identity is examined through Narrative Identity.

Narratives in Social Contexts:

We are proposing a classification of narratives into two types: External and Internal Narratives.^[1]

A) External Narratives (EN), the stories in society about people and places, which is history. The discipline of narrative inquiries, a qualitative type of analysis, is also related to EN. External Narratives, the recording of human history in all of its forms has emerged as an expression of auto-noetic (self-aware) consciousness, the ability and need to maintain a timeline between past, present, and future.

In the ancient world, Herodotus, the father of history, used biographical narratives, the stories of individual people, to reconstruct events (retroactively), thus creating history. Initially, narrative inquiry was used to also predict patterns. In the ancient world, predicting the patterns of the flooding of the river Nile, which created fertile soil, could predict the quality of crops. Nevertheless, the major role of history in society is its participation in both group identity and individual identity of its members. Today we still study history to understand the present and the future.

External narratives shape individual internal narratives in society. They are included and relied upon in many disciplines, such as literature, philosophy, ethics, and culture. The very purpose of having a universal culture and literature is based precisely on the natural need of humanity to have common denominating stories. Characters developed by William Shakespeare and Honoré de Balzac do not just portray segments of society as they saw them. Socrates' claim that "An unexamined life is not worth living" is based precisely on the ability to learn, assimilate and then re-route the contents of our examinations and the resultant moral lessons to implicit memory. Absent such examination, a fictive self may result. Goethe, Schiller, Victor Hugo, André Gide, and Marcel Proust have all created characters or provided insights about how we humans function internally.

External narrative can also create social cohesion under a variety of circumstances. The need of coherent meaning in a common story is also expressed in the spontaneous creation of narratives in groups when information about the future is not readily available. Rumors and gossip are spontaneous creations of a new reality. They are readily accepted as truth in order to fill in missing information about the present and

future. Otherwise, such informational gaps can create uncertainties about the future (Sunstein, 2009). Though often based on falsehood, gossip and rumor narratives create meaning that is vital in maintaining stable and trusting relationships in society (Novac, McEwan & Bota, 2014). So intense is the drive for creating meaning in relationship based on these narratives, that ethics and religions have imposed mandates and regulations to limit the potential damaging repercussions of unchecked narratives.

B) Internal Narratives (IN) refer to personal history Based on recorded or memorized personal experiences. Human personal experiences constitute our autobiographical memory. But humans (and in fact, all mammals) have the capacity to record events *beyond any full awareness* of the recall. It is this aspect of internal narratives that constitute Identity Narrative (IdN). Thus, internal narratives, “memories,” are comprised of individual experiences, sometimes personal stories, which often are the building blocks of autobiographical memory (Novac 2013). Internal narratives include the unconscious IdN and the conscious autobiographical memory including narrative identity.

To the study of social events, both internal and external narratives are relevant. The ties between internally created narratives by group situations as shaped by historical events will influence, at any given time, the collective narrative of a group. Such a collective narrative is still the resulting effect of concomitant narrative reshaping of groups in society or an entire nation. Internal group narratives, the potentiation and playing of beliefs will influence voting in democracies. Certain factors, like commonly held beliefs, misperception or the presence of financial deprivations can unify internal narratives of groups or an entire nation. At crucial vulnerable moments in history, populist leaders can create a new, external narrative by finding a common enemy or a wide promise of deliverance.

This is a social phenomenon that is well known to political historians. When seen in the psychological context through which internal and external narratives become synchronized, it becomes easier to comprehend how irrational behavior and significant social shifts can be activated. It is the fact that the external narratives (e.g., history, politics), become linked to IdN and autobiography, which carry deeply ingrained survival mechanisms. The psychological energy, the drive attached to survival behavior, cannot be overemphasized. History has shown that such major political upheavals can rapidly escalate with grave consequences for world peace.

Conclusion

In this paper, we have proposed the concept of Identity Narrative as an unconscious memory scaffolding for autobiographical memory. We are proposing that social phenomena be examined through the light of historical narratives of a nation or a group and their impact on autobiography of individuals.

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Beveridge, Bismarck and Southern European Health Care Systems: Can we decide which the Best in EU-15 is? A Statistical Analysis

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Abstract

A statistical analysis has been conducted with the aim to elucidate the effect of health care systems (HSs) on health inequalities assessed in terms of (a) differential access to health care services and (b) varying health outcomes among different models of HSs in EU-15 [(Beveridge: UK, IE, SE, FI, DK), (Bismarck: DE, FR, BE, LU, AT, NL), (Southern European model: GR, IT, ES, PT)]. In the effort to interpret the results of the empirical analysis, we have ascertained systematic differences among the HSs in EU-15. Specifically, it is concluded that countries with Beveridge HS can be characterized more efficient (than average) in the most examined correlations, showing particularly high performance in the health sector. Similarly, countries with Bismarck HS record fairly satisfactory performance, but simultaneously they display more structural weaknesses compared with the Beveridge model. In addition, our empirical analysis has shown that adopting Bismarck model requires higher economic cost, compared with the Beveridge model, which is directly financed by taxation. On the contrary, in the countries with Southern European HS, the lowest performances are generally identified, which can be attributed to the residual social protection that characterizes these countries. The paper concludes with a synthesis of the empirical findings of our research. It proposes some directions for further research and presents a set of implications for policymakers regarding the planning and implementation of appropriate policies in order to tackle health inequality within HSs.

Keywords: social policy, health care systems, health inequalities

Introduction

The positive or negative impact of the health care systems (HSs) on health inequalities has not been adequately studied, in an empirical and comparative way, by scholars. This remark highlights the originality of this paper, the purpose of which is to explore, at an empirical level, how the HSs in EU-15 affect health inequalities. The latter are assessed in terms of (a) access to health care services and (b) health outcomes. This

means that the HSs can possibly (re)produce, mitigate or even deepen health inequalities. Therefore, our main research question is to what extent and under what conditions the different HSs produce a positive or negative effect on health inequalities.

Methodology

In the macro-level survey, the methodological units of analysis are the EU-15 countries, grouped into three categories and based on the type of HSs:

Beveridge: UK, IE, SE, FI, DK

Bismarck: DE, FR, BE, LU, AT, NL

Southern European model: GR, IT, ES, PT

This macroscopic framework allows us to observe convergences and divergences between countries, based on the type of the HSs. The use of the latest available secondary empirical data has allowed us (after a sufficient number of empirical experiments, by using the statistical data analysis package-SPSS/Statistical Package for the Social Sciences) to provide useful empirical findings, in order to determine the effect of HSs on health inequalities.

Particularly, independent variables comprise of quantitative indicators which provide a sufficient framework of describing the operation of the HSs (tritych "financing, provision, regulation"). These are: "public health expenditure (% of current health expenditure)", "public health expenditure for long-term care (% of current health expenditure)", "private health expenditure (% of current health expenditure)", "private health expenditure for rehabilitative care (% of current health expenditure)", "private health expenditure for in-patient care (% of current health expenditure)", "private health expenditure for prevention and public health (% of current health expenditure)", "cervical cancer screening tests (% of women aged 20-69)" and "MRI scanning examinations, in hospitals / per 1,000 inhabitants").

Respectively, the dependent variables, which have been selected, can contribute significantly to the assessment of health inequalities. These are classified into two groups:

a. quantitative variables regarding the measurement of inequalities in terms of access to health care services ["self-reported unmet needs for medical examination due to high costs (% of the population)", "self-reported unmet need for medical examination due to high costs, over 65 years (%)", "self-reported unmet need for medical examination due to high costs, based on quintiles of equivalent income (% of population)"].

b. quantitative variables regarding the measurement of inequalities in terms of health outcomes ["people with long-term illness or health problem (% of population)", "people with long-term illness or health problem, over 65 years (%)", "people with

long-term illness or health problem, based on quintiles of equivalent income" over 65 years (%)", "self-reported health status as good / very good, over 65 years (%)"].

Additionally, it is highlighted that the empirical analysis is based on:

- a. time periods that have been selected aiming the representative presentation of trends over time, pinpointing the milestones of the period before and during the economic crisis (1995, 1998, 2001, 2004, 2007, 2010, 2013)
- b. different income groups of the population, which reflect the changes between lower (1st) and upper (5th) quintile of the equivalent income
- c. age groups, with an emphasis on elderly (in combination with the sex)

It should be noted that several restrictions have been identified with respect to the above data as well as shortcomings of chronological time series for all the examined countries.

Findings

In the effort to interpret the results of the empirical analysis, we have ascertained systematic differences among the HSs in EU-15. Specifically, it is concluded that countries with Beveridge HSs can be characterized more efficient (than average) in the most examined correlations, showing particularly high performance in the health sector. This finding is attributed to the distinct features of the Beveridge model, which include the approach of the "health" as a public good, the redistributive character of the HS and the state supervision of funding and provision.

Similarly, countries with Bismarck HSs record fairly satisfactory performance, but simultaneously they display more structural weaknesses compared with the Beveridge model. In addition, our empirical analysis has shown that adopting Bismarck model requires higher economic cost, compared with the Beveridge model, which is directly financed by taxation. In addition, the difficulty in restraining costs in conjunction with the increasing insurance contributions are the main drawbacks of the Bismarck model, which highlight the need to reconsider and reinforce the role of the state control.

On the contrary, in the countries with Southern European HSs, the lowest performances are generally identified, which can be attributed to the residual social protection that characterizes these countries. However, it is observed that Spain and Portugal show low rates of "self-reported unmet needs for medical examination due to high costs" in relation to the independent variables that have been tested. This fact can be attributed to the successful adoption of a universal HS, including long-term care, where citizens' satisfaction is sufficiently high, compared to Greece and Italy. These conditions often classify the Spanish and Portuguese HSs closer to the Beveridge model.

Paradoxically, in "inequalities in terms of health outcomes" it is verified that Greece has very low levels of "people with long-term illness or health problem, over 65 years" and simultaneously significantly high rates of "self-reported health status as good / very good, over 65 years" in relation to the independent variables. Despite the economic recession and austerity policies in health policy, it is clear that citizens have an inherent optimism, which is a key feature in their culture and it contributes remarkably to these levels. After all, the effects of the crisis are not directly apparent and often enough time has to be passed in order to pinpoint them.

Moreover, it is noticed that in periods of development of the welfare state, the total financing of the health sector is increasing in all three types of HSs. However, during the times of economic crisis and austerity it has been found that the Beveridge model generally (a) responds better to control expenditure growth and (b) displays better health indicators. Nevertheless, we should not forget that in a resource-containment environment, major insufficiencies predominate such as lack of staff and materials, long waiting lists, low rate of patient satisfaction, shift to the private sector and hence extensive health inequalities within the HSs.

It is also reminded that traditionally the Scandinavian model of care promotes the protection and welfare of citizens, defending with special concern the vulnerable groups of the population, such as the elderly and the poor. At the same time, the development of a statutory long-term care system in these countries (Beveridge) has a positive effect on health indicators. Conversely, as it has been ascertained, in the Southern European model the presence of an extensive network of informal carers derives from the weakness of the public funding in the long-term sector. These conditions do not often allow the fulfillment of health needs, leading citizens to private payments. Specifically, it is found that amid crisis Greece shows the highest rate of "self-reported unmet needs for medical examination due to high costs" in relation to the independent variables that were examined. This confirms the effect of the economic recession on (re)production of extensive health inequalities, which are likely to be caused by the constraint of health costs. In general, the observed variations in the size of public spending in long-term care sector reflect differences in both the demographic profile of the population and the development of the HSs.

Theoretically the Beveridge model promotes universal coverage ensuring that citizens have access to health care. However, the level of private health expenditure can not be characterised as inconsiderable. Thus, policy measures have been implemented in order to protect people (especially low-income groups or people suffering from chronic disease/long-term illness) from the incidence of illness. These measures include partial or total financial exemption as well as the establishment of a ceiling on the users' fees for in-hospital services. In this context, low levels have been achieved in the variables regarding inequalities in access and mainly in health outcomes. However, the above practices are not quite sufficient as they are unable to modify the Beveridge HSs to a protector of household incomes or a guarantor of the

socio-economic development/prosperity of all citizens. Therefore, access to care can not be characterised equal and fair, despite the presence of good health performance.

At the same time, this study has confirmed that the risk of "catastrophic" private spending is higher in the Southern European model, especially in Greece. Conversely, richer countries have the opportunity to invest and give priority to social policy areas such as health, to keep private payments relatively low and to limit the risk of catastrophic spending for households.

Theoretically, adequate public health care services and insurance cover protect citizens from private health costs. However, it has been found that low-income households or households with elderly people or people with a long-term illness are at greater risk of catastrophic health expenditure. For this purpose, private spending introduces a set of market criteria in the operation of the public HSs, which are subject to the informal rule "if you pay, you are served". Despite the constant efforts for structural and organizational changes within the HSs, health inequalities continue to exist. Simultaneously, the surge in private payments calls into question the effectiveness of the HSs in protecting the citizen from poverty and the incidence of long-term illness or poor health.

In addition, the empirical analysis has confirmed that private expenditure for inpatient care and rehabilitative care has negative impact on the poorest socio-economic groups of the population (1st quintile) that state "self-reported unmet needs for medical examination due to high costs" to a great extent. These groups of the population often delay or refrain from health care, which is needed to improve their health status. Consequently, these conditions do not allow the consolidation of health equality within HSs.

Regarding the effect of cervical cancer screening, it is concluded that screening programs can play a decisive role both in controlling the burden of morbidity and mortality and in reducing public health expenditure. In addition, the cervical cancer screening constitutes an excellent tool for evaluating the performance of HSs in EU-15.

Conclusion

Based on all the above findings, this study has concluded that despite the apparent diversity of the examined HSs and their health policies, modern European HSs have been forced to implement common solutions to common problems and weaknesses, leading to a convergence-path between them.

In this context, the implementation of the "Third Generation of Health Reforms" aims to achieve the utopian dipole "ensuring universal access - ensuring adequate financial resources for HSs". Additionally, it is observed that the "compulsive" state intervention in the economy sector has gradually been devalued. This has led to (a) divestiture of the state monopolies, (b) promotion of market competition and (c) wider reliance on market mechanisms. On individual level, these conditions place

greater emphasis on individual choice and responsibility. On political level, the citizens' expectations about the government outputs are limited. Although there is a convergence framework between European HSs, significant differences still exist in terms of funding, provision and regulation, which are still a challenge for researchers. As health care resources are limited, it is obvious that optimal effectiveness and efficiency criteria need to be implemented in the distribution of the existing inputs, especially under the conditions of the current economic recession.

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Why is the Coverage of Pneumonia Case Detection on Children under Five Years-Old Still Considered as Low in Sleman?

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Abstract

Pneumonia is one of the deadliest diseases for children under five years-old throughout the world. In Indonesia, pneumonia is the second deadliest disease after diarrhea. In 2015-2016, the Coverage of pneumonia case detection on children under five years-old increased from 22.33% to 36.06% but it had not achieved the detection target (>85%). A program evaluation needs to conduct, consequently. The evaluation aims to observe the implementation of pneumonia investigation program on children under five years-old in Sleman in 2016. The evaluation used a descriptive design performed in June-July 2017. The research subject was the program of Upper Respiratory Infection (ISPA, Infeksi Saluran Pernapasan Akut) implemented in community health centers (puskesmas, pusat kesehatan masyarakat). Twenty respondents as the sample were chosen by using the purposive sampling technique. The surveillance evaluation employed the input, activities, and output. The instruments were structural questionnaires and checklist sheets. The analysis result was presented in forms of tabulation and narration. From the input facet, 100% respondents have not had any special trainings related to pneumonia. 55% respondents have interlocking jobs with the longest service time of three years or more (75%). 70% respondents are able to show ARI Soundtimer. There are only 10% respondents holding the media of communication, information, and education (KIE, Komunikasi, Informasi, dan Edukasi) in forms of flipchart and leaflet; while 100% respondents admit that they have no stamp seal of URI. The proses facet

displays that 100% respondents do not arrange any plan. The case investigation is only passive (100%). 80% respondents do socialization of case management and only 15% respondents perform a home visit. 100% respondents have not held trainings for responsible people, alert villages, and private midwives. From the output facet, the scope of case investigation is still low (36.06%). The implementation of pneumonia case investigation program on children under five years-old has been well executed but there are still weaknesses. Hence, public health offices (dinas kesehatan) should improve their human resources by arranging a training program, equalize the use of breath counting tool and make MoU with all health services to report pneumonia cases. Community health centers are recommended to arrange plans, actively attempt to discover pneumonia cases, and train the responsible people, centers for pre-and postnatal health care (posyandu, pos pelayanan terpadu), or midwives related to the subject of pneumonia.

Keywords: program evaluation, pneumonia, descriptive

Introduction

URI (ISPA, *Infeksi Saluran Pernapasan Akut*) is one of diseases frequently suffered by children. Of all cases occurring, 7-13% cases were categorized as serious and demanded further actions of treatment. URI is one of major diseases with a high patient visit in community health centers (40-60%) and hospitals (15-30%). One of concerned URI diseases is pneumonia suffered by children under five years old. Pneumonia is an acute infection attacking the alveoli caused by various microorganisms; such as fungi, viruses, and bacteria (Ministry of Health, 2016).

Pneumonia is the deadliest disease for children under five years-old in all over the world (WHO & UNICEF, 2013). In Indonesia, pneumonia is the second highest disease causing death after diarrhea and there are 83 children under five dead every day (Ministry of Health, 2010). Pneumonia contributed 16% deaths of children under five in 2015 (Ministry of Health, 2016). The data from UNICEF reveal that among six deaths of children under five, one death was caused by pneumonia with the detail number of deaths was 920,000 each year, 2,500 each day, 100 each hour, and one each 35 seconds (UNICEF, 2017).

Indonesia reaches a higher number of death caused by pneumonia as much as 0.16 if compared to the death of children under five as much as 0.08% in 2014. Data by the Fundamental Health Research (Riskesdas, *Riset Kesehatan Dasar*) in 2007 indicate that pneumonia is the second deadliest disease for children under five (13.2%) after diarrhea (17.2%). One attempt conducted by the government to control this disease is by increasing the number of pneumonia case investigation on children under five (Health Profile of Indonesia, 2016)

By applying a target of pneumonia sufferer investigation, in 2013-2014 10% children under five assumed for suffering pneumonia in Sleman did not show any significant increase that meant it was still only 4-5%. However, in 2015-recent, by employing the assumption of case incident as much as 4.32%, the result of Fundamental Health Disease in 2013 displays an improvement (Health Profile of Sleman, 2016). Although the target of sufferer investigation in 2015 is less than previous years, up to these days the target has not been achieved. The scope of pneumonia investigation on children under five indicated an improvement from 22.33% to 36.06% in 2015-2016, yet the percentage had not reached the target of investigation (>85%). Such background unfolds the importance of having a program of pneumonia investigation evaluation in 2016 in Sleman.

Objectives

General Objectives

To observe the implementation of URI controlling program especially the pneumonia investigation on children under five in 2016 in Sleman.

Specific Objectives

To figure out the input, activities, and output of the implementation of pneumonia investigation in Sleman.

To figure out weaknesses of the implementation of URI program, especially the pneumonia investigation in Sleman.

To improve the implementation of URI program, especially the pneumonia investigation in Sleman.

Stakeholder Involvement

This program evaluation involves stakeholders of Sleman that are:

The head of control and eradication (P2, *Pengendalian dan Pemberantasan*) and the head of control and eradication section as the policy maker in the regency level.

URI programmers of Public Health Office of Sleman

The head of community health center of Sleman

URI programmers of community health center of Sleman

Officers involved in the pneumonia case investigation on children under five.

Methodology

The evaluation was conducted by implementing a descriptive design in June-July 2017. The research subjects were the managers of URI program in community health centers. The sample consisting of twenty respondents was taken by using the purposive sampling technique. The surveillance evaluation was executed by utilizing

inputs (force, fund, partnership, infrastructure, and support), activities (planning, implementation, monitoring, and evaluation), and outputs (Silverman, B., 2009). The data were primary and secondary data. The instruments were in forms of structural questionnaires and checklist sheets. The research result was presented in forms of tabulation and narration.

Findings

Respondents' Characteristics

The data analysis conducted in this program evaluation system was by analyzing each variable descriptively and the result was presented in forms of tabulation and narration. The data were gathered by conducting interviews by utilizing structural questionnaires given to pneumonia programmers in community health centers. The community health centers that became the analysis units were the Community Health Center of Prambanan, Kalasan, Mlati 1, Mlati 2, Tempel 2, Depok 3, Gamping 2, Minggir, Tempel 1, Turi, Cangkringan, Pakem, Ngemplak 2, Gamping 1, Godean 2, Depok 1, Moyudan, Godean 1, Seyegan, and Berbah. The distribution based on respondents' characteristics is shown in Table 1:

Table 1. The Distribution of Respondents' Characteristics of Age, Sex, and Education of in Sleman

Respondents' Characteristic	Number	Percentage (%)
Age		
21-30 years-old	3	15.0
31-40 years-old	4	20.0
41-50 years-old	6	30.0
51-60 years-old	7	35.0
Sex		
Male	5	25.0
Female	15	75.0
Current Education		
Senior high school/collaborative education unit/equivalent graduate	3	15.0
Diploma III of Nursery/Midwifery	15	75.0
Bachelor of Nursery/Midwifery	2	10.0

Table 1 shows that the age group with the most URI programs is the age group of 51-60 years-old, occupied by seven respondents (35.0%) and dominated by fifteen female respondents (75.0%). Education at the level of Diploma III of Nursery/Midwifery achieved by fifteen respondents possesses the largest portion (75.0%).

Input Aspect

Inputs involving force, funding, infrastructure, partnership, and supports in forms of logistic aspects are needed to support the improvement of pneumonia investigation. The result of input evaluation is as follows:

Force

Table 2. The Distribution of Respondents' Force Availability, Training Participation, Interlocking Position, Number of Interlocking Assignments, and Service Time in Sleman

Force	Number	Percentage (%)
Force availability		
Yes	20	100
No	0	0
Training Related to Pneumonia		
Yes	0	0
No	20	100
Interlocking Position		
Yes	20	100
No	0	0
Number of Interlocking Assignments		
≤3 interlocking assignments	9	45.0
>3 interlocking assignments	11	55.0
Service Time		
≤ 3 years	15	75.0
> 3 years	5	25.0

Table 2 displays that every community health center hires responsible officers as program holders. The interviews reveal the fact that all officers (100%) did not participated in any special training related to pneumonia in 2016. All program holders have an interlocking position with the highest number of interlocking assignments is more than three, had by eleven people (55.0%) and the most service time is three years or more, had by fifteen people (75.0%).

Funding

The result of interviews indicate that there is no specific funding available for pneumonia controlling activities. The funding is taken from the funding for another program.

Partnership

The result of interviews also reveal that for activities of pneumonia controlling on children under five, they have established a partnership/cooperation yet still limited to a cross-program partnership/cooperation. The partnership/cooperation is in forms of investigation and reporting of pneumonia cases on children under five.

Infrastructure

An ill child under five is generally treated in polyclinic (BPU, *Balai Pengobatan Umum*), the unit of Maternal and Neonatal Health (KIA, *Kesehatan Ibu dan Anak*) and special units for children under five. The distribution of departments responsible in performing checkups for ill children under five in community health centers is shown by Table 3.

Table 3. The Distribution of Departments Responsible to Perform Checkups for Children under Five-Years Old in Community Health Centers of Sleman

Community Health Center	Department for Checkups			Doctor Availability	
	Polyclinic	Unit of Maternal and Neonatal Health	Units for Children under Five Years-Old	Yes	No
Prambanan	√			√	
Kalasan		√		√	
Mlati 1		√			√
Mlati 2	√			√	
Tempel 2	√			√	
Depok 3	√			√	
Gamping 2	√			√	
Minggir	√			√	
Tempel 1	√			√	
Turi		√			√
Cangkringan	√			√	
Pakem	√			√	
Ngemplak 2	√		√	√	
Gamping 1	√			√	
Godean 2		√			√
Depok 1	√			√	
Moyudan		√			√
Godean 1		√			√
Seyegan	√			√	
Berbah		√		√	

Table 3 displays that there are twelve community health centers performing checkups for children under five in the general examination office (BP, *Badan Pemeriksaan*), seven community health centers performing checkups in the department of maternal and neonatal health, and one community health center facilitated by a special chamber for performing the checkups.

Logistic Availability

The result of checking the logistic (ARI Soundtimer) availability found in the field is presented in Table 4.

Table 4. The Distribution of Availability and Eligibility of ARI Soundtimer in Sleman

Community Health Center	Availability ARI Soundtimer		Eligibility of ARI Soundtimer	
	Yes	No	Yes	No
Prambanan	√		√	
Kalasan	√			√
Mlati 1	√		√	
Mlati 2		√		
Tempel 2		√		
Depok 3	√		√	
Gamping 2	√		√	
Minggir	√		√	
Tempel 1	√		√	
Turi		√		
Cangkringan	√			√
Pakem		√		
Ngemplak 2	√		√	√
Gamping 1	√			√
Godean 2	√		√	
Depok 1	√		√	
Moyudan	√			√
Godean 1	√			√
Seyegan		√		
Berbah		√		

Table 4 shows that of twenty community health centers where interviews and observations were conducted, there are fourteen community health centers (70%) facilitated with ARI Soundtimer. Of those fourteen community health centers, there are nine community health centers equipped with ARI Soundtimers (64.3%) that can still be operated.

Table 5. The Distribution of Medicine Availability; Guide Book; Media of Communication, Information, and Education; and Media of Recording and Reporting

	Number	Percentage (%)
Logistics		
Medicine		
Availability of pneumonia medicine	20	100
Guide Book		
URI controlling	20	100
URI management	20	100
Media of Communication, Information, and Education		
DVD video	0	0
Poster, leaflet, flipchart, etc.	2	10.0
Media of Recording and Reporting		

URI stamp seal	0	0
Daily registration book	20	100
Monthly reporting form	20	100
IMCI (Integrated Management of Childhood Illness) (MTBS, <i>Manajemen Terpadu Balita Sakit</i>) form	20	100

Table 5 displays that all community health centers facilitate their clients with guide books of URI controlling and management. Nevertheless, logistic tools for the media of maternal and neonatal health have not been provided by all community health centers. Only Community Health Center of Tempel 2 and Pakem provide the media of maternal and neonatal health in forms of leaflet and flipchart. All community health centers are reported for not holding the URI stamp seal. The register book is still combined with the registration book of maternal and neonatal health since those community health centers have not attempted to make a separated registration book for pneumonia cases. Furthermore, all community health centers have made monthly IMCI forms.

Activity Aspect

The result of activity process evaluation related to pneumonia on children under five in Sleman is as follows:

Activity Planning

After being interviewed, all programmers stated that they had not made any planning for pneumonia programs; such as conducting problem analyses, identifying and determining planning objectives, arranging PoA (Planning of Action), and planning logistics and budgets for the pneumonia controlling activities themselves.

Activity Execution

Table 6. The Distribution of Respondents Based on the Execution of Pneumonia Controlling Activities on Children under Five Years-Old in Sleman

Activity Execution	Number	Percentage (%)
Planning	0	0
Case investigation		
Active	0	0
Passive	20	0
Socialization of standard management	16	80.0
Early detection of pneumonia cases and clusters	20	100
Immediate case management in accordance with the standards	20	100
Management of severe pneumonia case in accordance with the standards	11	55.0
Home visit for cases with impossibilities in revisiting	3	15.0
Referring severe pneumonia cases to hospital	5	25.0
Gradual reporting within 24 hours after detecting pneumonia cluster cases	0	0

Performing monthly recording and reporting	20	100
Presenting and analyzing data in forms of table, chart, map, etc.	0	0
Collecting, analyzing, interpreting data, and taking controlling actions	0	0
Broadcasting information through workshop coordination	20	100
Counselling the risks of communication, information, and education	20	100
Arranging a regular, cross-program meeting		
Arranging a regular, cross-program meeting to monitor the program progress and problem solving	20	100
Coordination with the heads of sub-district, neighborhood, hamlet, or related instance to investigate and control any risk factors	0	0
Train the responsible people, alert villages, pre- and postnatal health cares, and private midwives in order to familiarize them with pneumonia and conduct preventive attempts	0	0
Monitoring and evaluation	20	100

Table 6 shows that the investigation of pneumonia case on children under five is still passively conducted. The case investigation is only performed when the patient goes to community health center. There are four community health centers (20%) whose program holders do not perform socializations of standard management that are Community Health Center of Kalasan, Mlati 1, Pakem, and Depok 1. Relevant information has been distributed by all community health centers yet still limited on a cross-program distribution. The early detection of pneumonia and cluster as well as the early case management have been conducted by all community health centers.

There are three community health centers (15%) whose officers performed home visits that are Community Health Center of Depok 3, Tempel 1, and Tempel 2; whereas there are five community health centers (25%) that have suggested severe pneumonia cases being referred to hospitals that are Community Health Center of Prambanan, Depok 3, Gamping 2, Tempel 1, and Godean 2. All community health centers have made monthly recording and reporting but gradual reporting within 24 hours after the detection of pneumonia case has not been made by all community health centers. Besides, data analysis and interpretation have not been conducted as well.

Specific counselling related to communication, information, and education/risky communication of pneumonia has not been executed indeed but simple counselling during activities of pre- and postnatal health care has been arranged. A cross-sector cooperation to investigate the controlling of risk factors and trainings for the responsible people, alert villages, private midwives, and pre- and postnatal health cares to recognize symptoms of pneumonia and preventive attempts of pneumonia suffered by children under five have not been built and arranged due to unavailable fund.

Output Aspect

The coverage pneumonia case detection under five years-old in 2016 in Sleman was only 36.06%. The percentage has not reached the target determined for Sleman.

Discussion

The target of pneumonia case investigation on children under five in Sleman is still considered as low. To figure out the causes, the research analyzed the aspects of input, activity, and output.

Input Aspect

The Ministry of Health argues that training is the most crucial aspect to improve the quality of human resources, especially in case and program managements.⁷ During interviews, the URI program managers conveyed that they did not join any special training related to managements of pneumonia case and other relevant programs in 2016. They also revealed that they only took participation in socializations of pneumonia. There are still also many program holders with ≤ 3 -years service time and desperately need training to improve the quality of human resources.

Fund availability is one of considerably determining factors to perform pneumonia controlling activities since those activities can only be conducted if supported by sufficient fund. Decree of the Ministry of Health highlights that the funding of URI control and eradication program largely depends on the State Budget (APBN, *Anggaran Pendapatan Belanja Daerah*) (Decree of the Ministry of Health, 2002). During interviews, programmers revealed the fact that there is no funding earned by community health services to control pneumonia and that funding for another program has to be used.

Checkups for children under five can be executed in polyclinics, units of maternal and neonatal health, and special units for children. However, the researchers found out that the checkups were mostly conducted in polyclinics. The obstacle exists when human resources of those polyclinics are not adequate to overcome the number of patients coming so that IMCI cannot be completely applied.

Partnership is one of important factors to succeed the program. Partnership establishment related to the pneumonia investigation aims to improve the society's participation and roles of cross-sector and cross-program distributions. In approaches of implementation of disease eradication program especially for pneumonia, partnership is expected to be able to be executed in an integrated and comprehensive way. The pneumonia eradication with the help of competent, active sectors is not only targeted to the sufferers and risk factors but also other influential factors (Ministry of Health, 2012).

The interview results unfold the fact that cooperation of pneumonia case investigation on children under five has not been optimally established. It is still only internal or inside building. Cases occurring outside building that might be handled by

private midwives, polyclinics, or private hospitals have not been reported to community health centers so that those community health centers only deliver reports containing the number of pneumonia patients inside building to the Public Health Office of Sleman.

Decree of the Ministry of Health states that the investigation should be conducted through activities supporting the desire of society to get the right medicine, assisted by health officers. Hence, reports of pneumonia sufferer investigation of various health facilities, including government and private health facilities have to be delivered to the public health office or community health centers nearby (Decree of the Ministry of Health, 2002).

Logistics are crucial to succeed the investigation of pneumonia case. Necessities of investigation and case management involve breathing apparatuses (ARI Soundtimer) and medicine; while the media of communication, information, and education are requested for the activities of communication, education, and information. Other necessities to support the investigation of pneumonia on children under five are guide books and recording and reporting media (Decree of the Ministry of Health, 2012).

Logistic availability in Sleman can be categorized as good. However, there are community health centers possessing inabilities to use ARI Soundtimer properly. There are even community health centers that still put the timer in the warehouse and do not operate it. All community health centers have provided guide books. Nevertheless, the media of communication, information, and education is still inadequate and thus it impediments counselling activities related to pneumonia.

Activity Aspects

Planning

Planning is an activity supposed to be done before arranging a certain activity or event to achieve goals within a certain period. Planning is performed to improve efficiency and provide guidance to implement a certain program in order to be able to be utilized as an evaluation base (Asropi, 2013). In interviews with the program holders, it is conveyed that there has been no planning done, causing a minimum investigation implementation.

Execution

Investigation of pneumonia on children under five should be actively conducted to expand the scope of case investigation and hence the target can be achieved. In line with the result of research by Marlinawati, the result of this research also points out that community health centers achieving their national target perform the case investigation actively and passively; while unsuccessful community health centers perform the case investigation passively only (Lina Sri Marlinawati, 2015).

Investigation of pneumonia case by all health facilities (hospital, community health center, community health sub-center (Pustu, Puskesmas *Pembantu*), pre- and

postnatal health care, and private health facility) should be actively and passively reported by using standard instruments stipulated by community health centers, public health offices of regency as well as Public Health Office of Sleman.

The research by Marlinawati in Tangerang proves that the failure of community health centers to achieve the target of pneumonia investigation is affected by the difficulty in finding pneumonia cases on children under five and no reporting of private clinics. This research also supports the finding resulting that pneumonia cases are still passively investigated and conducted inside building; while pneumonia cases outside building remains unknown (Lina Sri Marlinawati, 2015).

The majority of community health centers have conducted socialization of standard case management yet still intern (cross-program) only. The distribution of information through workshop coordination has also been executed during mini workshops or the monthly Reflection Case Discussion (RCD) meeting. Nevertheless, the topic discussed is still the number of pneumonia cases; whereas the attempts to investigate cases and overcome and monitor the program of unsuccessful problem solving are still out of range.

Decree of the Ministry of Health states that to improve the investigation of pneumonia and its management quality, the IMCI approach should be implemented in health facility units. This is necessary to improve the quality of health services for children, to improve the scope of pneumonia investigation, and to decrease the number of suffering and death due to pneumonia on children under five (Decree of the Ministry of Health, 2002).

Approaching ill children under five can be conducted by applying IMCI. IMCI should be executed in polyclinics by nurses. However, the research results indicate that IMCI is not applied to all ill children. There are even health facilities that do not apply it so that the checkups are performed by midwives. Case detection in units of maternal and neonatal health is also assisted by IMCI. For the units existing without doctors, referral to polyclinic will be given.

To improve the quality of IMCI implementation, a separated chamber should be provided and conveniently and appropriately designed for children.³ This research figures out that checkups for ill children under five are still performed in the general poly and unit of maternal and neonatal health. Investigation of pneumonia cases by using IMCI in the unit of maternal and neonatal health should have achieved a complete success with the percentage of 100% but the interview results reveal the contrary.

The barriers are that there are many patients that have to be treated; while officers take a long time to complete one IMCI form for one patient. It means that the existing workforce is insufficient to treat the ill children. Troublesome children worsen the situation since making the officer miss TDDK by losing their concentration.

This research also discovers the fact that almost all community health centers never had any home visit for children under five that did not revisit the centers two days after treatment due to the funding absence for performing such visit. Cooperation with supportive public health offices, the heads of sub-district, neighborhood, hamlet, or related instances to investigate the risk factor controlling has not been conducted either due to the limited fund and time.

A successful pneumonia controlling is also considerably determined by roles of society. The society has to aspire others to participate in the program implementation and utilize health infrastructures and facilities. To improve the participation of society in pneumonia controlling, training of pneumonia controlling is arranged. The research figures out the fact that program holders have not arranged any socialization or training for people responsible in health facilities, alert villages, private midwives, or private polyclinics.

Conclusions and Recommendations

Conclusions

The implementation of pneumonia case investigation in Sleman has been well conducted but there are still weaknesses requiring fixation that are:

From the input aspect: inadequate breath counting tools with usage irregularities, absence of cross-sector cooperation, absence of specific funding to support pneumonia controlling activities on children under five, and ≤ 3 years service time experiences as a program holder.

From the activity aspect: absence of program planning, passive case investigation, investigation of pneumonia cases with IMCI less than 100%, incomplete home visit for pneumonia sufferers that do not revisit after treatment, absence of trainings for responsible people, private midwives, pre-and postnatal health care, private polyclinic to recognize pneumonia symptoms and preventive attempts for pneumonia.

From the output aspects: low coverage of pneumonia case detection on children under five in 2016 in Sleman (only 36.06%) while the percentage of achievement target is $>85\%$.

Recommendations

Public Health Office

Monitoring, evaluating ARI Soundtimer availability, and providing three soundtimers for one community health service are required to be conducted. Uniformity in utilizing breath counting tools are also required to be performed in all community health centers.

Agreement between public health offices and community health services to examine children under five in the chamber of maternal and neonatal health or in a special

chamber for ill children thus enables all children to be treated by nurses is required to be made.

Improvement of human resource quality by giving trainings to the program holders and health workforces responsible to be an executor in detecting the ill children by providing training to refreshing relevant knowledge should be conducted.

A cooperation commitment to report pneumonia case investigation to community health services in the form of MoU should also be established by public health offices, community health services, hospitals, polyclinics, and other private health services in Sleman.

Community Health Service

Planning of funding, logistics, and activities to support the improvement of pneumonia investigation scope needs to be arranged.

A commitment of community health services to implement IMCI for improving the pneumonia case investigation on all ill children under five is required.

An active case investigation and home visit for sufferers who do not revisit after treatment should be performed.

Trainings or socializations of symptoms and preventive attempts for private midwives, responsible people, alert village, and pre- and postnatal health cares to improve the investigation of pneumonia cases should also be arranged.

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