The Effects of Mother's Social Media Usage to Toddler's Health Status in Indonesia

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インドネシアにおける母親のソーシャルメディア接触が子育て、とりわけ幼児の健康にどう影響するかを検証した。接触時間の長さは一般的な健康状態にネガティブ、基本的な予防接種の実施についてはポジティブな影響を及ぼしていた。

Abstract

This study aims to explore the effect of mother's social media usage on child health indicators. These indicators are: health status, exclusive breastfeeding status, and complete basic immunization status. To account for the potential endogeneity in social media usage, we used the presence of BTS (Base Transceiver Station) and signal strength as the instrumental variables. The data used in this study are derived from the National Socioeconomic Survey (Susenas) of 2015 and Village Potential Data Collection (Podes) of 2014. Using the biprobit regression (bivariate probit) as the estimation method, the analysis results show that the presence of BTS and the proven signals are valid instrument for social media usage, while the influence of social media on the three child health indicators are varied. The use of social media negatively affects the health status of children under five during the past week. Meanwhile, the status of exclusivity of breastfeeding infants is not influenced by the use of social media by mothers. Finally, the positive effect of social media was found on the status of completeness of basic toddler immunization in Indonesia.

Keywords social media, endogeneity, instrumental variables, health status, biprobit regression

Introduction

Health is a basic human capital that becomes an important input in forming quality of human capital, where quality human resources are needed in supporting the long-term development process[8]. Within the current global framework, it is shown that investments in under five health result in large social and economic returns[39].

Results of Indonesia Demographic and Health Survey (IDHS) 2012 indicates substantial inter-provincial health disparity problems, although some health indicators have achieved high coverage rates[9]. Conditions that are exacerbated by this socio-economic difference require more strenuous and strategic efforts to overcome them[35]. Müller and Krawinkel[27] estimated that 53 percent of under-five mortality in developing countries is due to malnutrition[15]. Chronic protein and energy deficiency are indirectly caused by the problem of household poverty, where knowledge and low level of maternal education exacerbate nutritional problems in infants[11]. Therefore, the importance of efforts to increase the literacy on health that must be done by parents, as this proves to be one way to overcome the problem of child health disparity, especially in Indonesia[36].

Although health literacy is a new concept in the field of health promotion, it is important to build a person's ability to obtain and retransmit information received[28]. So that with the improvement of access to health information, will have an impact on improving the health status of children under five and become an effective strategy to deal with current public health problems[11].

Entering the era of net generation today, educational

entertainment, or edutainment, become a more effective way to change the behavior or habits of the individual than to convey information directly even frontally[4]. Someone is left to understand the facts that exist, until the information received can be used to compare whether the behaviors in his life are in accordance with social norms or rules that apply. This mechanism is now widely adopted in educational and health education activities that are systematically introduced as a form of health promotion[24].

Online media with various types of social networks is now a potential for highly effective information[18, 21, 23]. The relationship of friendship or family created among social media users is often a social support that proves to increase the happiness of a mother that affects the condition of a healthier and prosperous child[26]. In Indonesia, social activism by organizations such as the Indonesian Breastfeeding Association (AIMI) also utilizes social media in its campaign on exclusive breastfeeding[15].

Today, the development of digital technology is increasing, expanding the information and news content through social media. As noted above, social networking-based applications make it easier for users to get information or consultations related to health issues. Statistical data shows the percentage of female Internet users continue to increase, which amounted to 82.05 percent of Internet users use it to access social media[38].

Referring to the research of Beck et al. (2014) who said that the productive age group as a group that trusts online information as an accurate source of information, finds out specifically that the majority of health-related online information seekers are productive age women who have children[5]. Because some researches in Indonesia have discussed the negative impacts of social media usage on children, whereas in some countries the use of internet and social media has also had an impact on improving child's health[14, 26], then to find out the clarity of the statement and to fill in a study that was not there before, this research will be conducted.

Conceptual Framework

Health Status and Health Behavior

Health is a dynamic thing that marks the welfare of physically, mentally, and socially, which if all the welfare is not fulfilled then the condition is stated otherwise, that is ill[7]. In under-five health, the prevailing health determinant does not differ greatly from the general health determinant. The only difference is that toddlers are one of the most vulnerable groups that benchmarks the performance of a region's health system[20].

Theory about health behavior that is widely used is the Theory of Planned Behavior (TPB) proposed by Ajzen (1991)[1], where attitude subjective norm and perceived controls together affect a person's behavior. Berman, Kendall, and Bhattacharyya (1994) developed a conceptual framework for analyzing the health status and changes caused by intervention in a household called The Household Production of Health (HHPH). The main focus of concern in HHPH is the health of household members, and one of the health behaviors in the household is the care of infants and the feeding of children, such as breastfeeding.

UNICEF (2003) promotes appropriate feeding for infants, one of them with breastfeeding. Breastfeeding in infants is the best and unparalleled way for the development of infant health and growth. In addition, the breastfeeding process is also a part of the reproductive process that has important implications for maternal health. A global public health recommendation recommends that infants should be exclusively breastfed for 6 (six) months from birth to achieve optimal growth, development and health[42].

Social Media Network

The basic concept of meaningful development of social media today started since the rapid growth of social networking sites[37]. These social networks are digital and online. Social networks are able to describe the flow of information spinning among individuals within a network, and how a group of individuals has stronger ties than other groups 16. It is also said that different types of media cause different network patterns, this is

dependent on the form of information flow made possible by the media.

Kaplan et al.[18] define social media networks as "a group of Internet-based applications that built on the ideological and technological foundations of Web 2.0, which allows the creations and exchange of user-generated content". Social media is understood as a group of online media types that are divided into five characteristics, i.e. participation, openness, conversations, community, and connectedness[25].

Kietzmann, Hermkens, McCarthy, and Silvestre (2011) built a "Honeycomb Framework" of seven social media functional building blocks, consisting of identity, conversations, sharing, presence, relationships, reputation, and groups[19]. Social media application like Facebook and Twitter, has more dominant relationship function. Facebook users can expand relationships with friends or new families who are not close to them.

Mechanism Relationship of Social Media Usage with Health Status

The media generally influences the behavior and lifestyle of individuals through two ways, information processing and observational learning[33]. When the individual learns new things as a result of seeing the information on the media they uses, then the results of this observation will be stored as memory. Once memory is stored in the brain, memory usually persists and can easily be called at any time (recall). The combination of information and learning acceptance mechanisms on observed matters if done in a recurring process will increase the awareness of the individual about the importance of health. This knowledge if supported by positive health behavior change will make the individual to better able to voice the right of health better, one of them by utilizing health service to be more optimal.

In the communication network, the use of social media will be more widespread if many others, such as friends or relatives also use it. Cohen (2004) describes a mechanism that describes the effect of social relations on health. It is said that those who participate in social networks will tend to gain social control and peer support that influence what they do, especially in health behaviors. Integration within social networks is a source of positive influence that makes one knows the ideal rules and norms expected[10].

In studies that measure the impact of media on a family's condition such as health status, Price and Dahl (2012) suggests a 'natural experimental' approach to be more appropriate[32]. This is because media usage is a study that has long-lasting effects as well as naturally there are variations in individual exposure to media due to random differences about the number and type of media that individuals use. The existence of this potential bias that causes media variables are said to be endogenous variables.

Methods and procedures

Research on the use of social media like this study also has the potential bias. Two kind bias in this study are, *First*, in the access of the mother's social media and its relation to the health status of the child, it cannot be measured by the mother's type of care for the child. If it is assumed that social media play a role in the dissemination of health information, mothers who have access to social media does not necessarily indicate that she is a mother who cares about children's health. *Second*, the impact of social media can also be felt by people who do not access directly, but get information from others. This potential bias that causes social media variables is said to be endogenous.

To overcome the potential bias in inferencing analysis, the method of estimation using the Instrumental Variable (IV) will be used. A good instrument criterion as said by Angrist and Krueger (2001) is to have a strong and unexplained relationship to endogenous variables that have the potential for such bias, but have no relationship to the dependent variable[2].

This study uses the existence of base transceiver station (BTS) and signal strength as instrument variables that are considered to have strong relation internet access and social media, but have no relation to child's health. The use of this instrument is based on previous research by Olken (2009) which says the signal is an appropriate instrument to examine the impact of media considering the signal strength in Indonesia varies due

to topographic differences[29]. Meanwhile, BTS is chosen as an instrument because of its function as a transmitting station that facilitates wireless communication between communication devices (cellular phones, wireless networks) with network operators.

Data

The main data used in this study is the data from the Indonesian national socioeconomic survey (Susenas) 2015 and potential village census (Podes) in 2014. Susenas 2015 data gives detailed questions concerning information and communication technology. This survey was conducted in March 2015 with a total sample of 300,000 households that can be estimated up to the district level, which allows to be combined with Podes 2014 data at the village level. This study assumes that the characteristics of respondent's village did not change significantly from the time of Podes 2014 census conducted.

Unit of Analysis

The unit of analysis used in this study is toddlers (infants under five years old) from mothers who have ever married. The age of a toddler in the unit of analysis is distinguished for each indicator / model. In the first model, namely the model of under-fives health status proxied by health complaints using a unit of analysis of children aged 0-59 months. The second model is the exclusive breastfeeding status model using a unit of analysis of children aged 7-23 months. And the third model, complete basic immunization status analyzes toddlers aged 13-59 months.

Variables

The dependent variable in this study was seen from 3 (three) indicators. *First*, the health status of children under five. *Second*, toddlers who get exclusive breastfeeding. *Third*, toddlers who get complete basic immunization. Health status is seen by the presence or absence of health complaints in the past month. Measuring health status like this is subjective in that the respondent assesses health status based on the respondent's self-perception (Self-Rated Health Status). Health status defined as binary caterogrical variables: 1, if the child has no health complaints (health) in the past 1 month and 0, if the child have health complaints (sick).

Meanwhile, for second dependent variables, breastfeeding is said to be exclusive if the infant is given only breast milk without other companion drinks, but with the exception of vitamins, minerals, and drugs. Decision of Ministry of Health (2004) states that breastfeeding exclusively for infants in Indonesia from birth to infants aged 6 (six) months[34]. In this study, breastfeeding variables are also defined as binary categorical variables: 1, if the toddler gets exclusive breastfeeding and 0, if the toddler does not get exclusive breastfeeding. And the last for the third indicator, if toddlers get complete basic immunization, variables defined with score 1, and score 0 for defined variables that toddlers do not get complete basic immunization.

The main independent variable used in this research is mother's accessibility to social media. In this study, this variable obtained from the question: "whether the mother access the internet for social media/social network like Facebook, Twitter, BBM, WhatsApp, Skype, and so forth?". Accessing the internet itself means when a mom spends time to access the internet so she can utilize or enjoy internet facility which in this case is social media. Activities that are said to access the internet even though it does not have the ability to open and close (log in and log out) the internet but just stay on. This independent variable categorized into two: 1, if mother uses social media, and 0, if mother does not use social media.

In addition to the variable use of social media by the mother, in this study also used independent control variables in the form of socio-economic characteristics of the mother's demography, the characteristics of children, the characteristics of the household, and the characteristics of residence.

Estimated model

This study applies the Seemingly Unrelated Bivariate Probit (SUBP) estimation method which is considered the best method used when testing two equations where the dependent variable in one equation is the main

independent variable in the other equation[31]. So based on the previous description, the regression model used in this study can be written as follows:

$$\text{Prob}\left(Y=\frac{1}{X}\right)=\Phi(x\beta) \qquad (1)$$

where, Φ is the cumulative standard normal distribution. The estimated structural equations can be presented as:

$$Y_i=\alpha+\omega Z_i+\beta_i\sum_{i=1}^{n} X_i+v_i \qquad (2)$$

$$Z_i=\gamma+\delta_i\sum_{i=1}^{n} X_i+z_i \qquad (3)$$

Y and Z are the latent variables of child health indicators and using social media, respectively. These variables are dummy variables with values of 1 if dependent variables refers to health or get exclusive breastfeeding or get complete basic immunization or mothers using social media and 0 otherwise. Also *γ, α, β,* and *ω* are the estimated parameters and X_i are the control variables. Included control variables are age of mother (in years), marital status (2=married, 1=divorced, 0=death divorced), number of children even born, mother work status (1=work, 0=others), mothers education (4=college, 3=senior high school, 2 = secondary high school, 1=primary school, 0 =no primary), child's sex (1=female, 0=male), health insurance (1=yes, 0=no), peer family (mean), expenditure per-capita (measured in *ln*), residence (1=rural, 0=urban), health service (1=yes, 0=no). The errors terms of the model are dependent and distributed as a bivariate normal such that: E (v_i) = E (z_i)=0, var (v_i)=var (z_i)=1 and $\rho=cov\ (v_i,z_i)$. The wald test which is reflected by statistical significance of ρ was used to determine whether the models would be estimated jointly in recursive manner or not.

Result and Discussion

Sample Characteristic

The distribution of sample is presented in Table 1. Table 1 shows the characteristics of the samples studied for three model. First model, the number of observations in children aged 0-59 months is 88.507 with the percentage of mothers who are social media users is 15,90%. Second model, the number of observations in children aged 7-23 months is 24.155 observations with the percentage of mothers who are social media users is 16,98%. And the third model, the number of observations in children aged 13-59 months is 70.771 observations with the percentage of mothers who are social media users is 15,35%. Then if disaggregated by group of island residences, 1 in 3 mothers of social media users live in Java Island (Appendix A).

Table 1. Sample Distribution by Mother's Social Media User

Indicators	Obs.	Mother using social media (%)	
		Yes	No
(1)	(2)	(3)	(4)
Child health: children aged 0-59 month	88507	15,90	84,10
Exclusive breastfeeding: children aged 7-23 month	24155	16,98	83,02
Basic immunization: children aged 13-59 month	70771	15,35	84,65

According to the social characteristics of maternal demographics, the distribution sample shows that mothers aged 30-31 years old are in married status with number of children are 2 until 3. Then, sample in this study also shown majority mothers graduated from high school or equivalent. Mother in non-working conditions also dominant in this sample. Meanwhile, the distribution sample for children, it shown that majority under-fives aged child are male and already have health insurance. Within households, the average social media users other than mothers are also few, not more than 10 percent per household member.

The low internet and social media users are in line with the value of individual consumption spent, where the average expenditure per capita only ranges from 715 to 722 thousand Rupiah per month. Furthermore, for the characteristics of the region itself, most samples come from households living in villages with available health services and dominant availability of BTS and strong signals in the region (Appendix B).

Child health profile

Table 2 shows that mothers who access social media,

the percentage of children who are in a healthy state is lower than mothers who do not access social media. This is inversely proportional to the other categories, where it appears that mothers who use social media, the percentage of children who get exclusive breastfeeding and complete basic immunization are higher than toddlers with mothers not accessing social media.

In the indicator of health status, the highest percentage of children under five who are sick, is in infants with maternal age characteristics 30-34 years old, divorced, middle schooled, and working. While the highest percentage for toddlers obtained exclusive breastfeeding and complete basic immunization was in the toddler group with mothers who had an age range of 30-39 years, were married, the number of children owned was no more than 2, and in conditions not working.

According to the demographic characteristics of toddlers, it was seen that female toddlers had a lower percentage of sick status than male toddlers. This is in line with the condition that exclusive breastfeeding for female toddlers is greater, even though the basic immunization status for male toddlers is higher. Another unique thing that was found was that toddlers who had health insurance had a higher percentage of unhealthy than toddlers who did not have health insurance. While different conditions in exclusive breastfeeding status and complete basic immunization, where the percentage is higher in infants who have health insurance than those who do not have. Meanwhile, according to household characteristics, it can be seen that the sample distribution in children under five is unhealthy, the largest percentage is owned by infants from families with an average high per capita expenditure and access to social media that is also owned by other household members besides mother. Nevertheless, this characteristic also appears dominant in the exclusivity status of breastfeeding and complete basic immunization.

Model Analysis

In a model examining the effect of endogenous use of social media on the three indicator child health, it is shown that social media is an endogenous variable with the presence of BTS and signals significantly affects the use of social media. Where the value of the correlation coefficient (ρ) in the final stage of significancy 0,01 indicates that both tend to be fully independency. Social media itself becomes a variable that does significantly affect health status and basic immunization, but doesn't affect exclusive breastfeeding when all control variables are included (Appendix C). This generally indicates that breastfeeding behavior is basically a maternal human right that is not constrained by external factors such as neighborhoods[13]. The following Table 3 shows a percentage summary of the changes in the independent variables on the three indicator child health in full.

Table 3 below shows evidence that maternal social media use significantly influences the health status and basic immunization of the child, but has no significant role in influencing the behavior of excluding breastfeeding of toddlers in Indonesia. For health status indicator, the mothers who use social media have a negative and statistically significant effect on the health status of their children in the past week with a p-value of less than 0.01. The marginal effect value is -0.1353 indicating that mothers of social media users will reduce the chances of toddlers to be healthy (not having complaints) during the past week of 13.53%. This finding is interesting because the use of social media by mothers in Indonesia does not have the same impact as the use of social media by mothers in developed countries. One of Johnson's (2014) studies captured the role of increasing digitalization in Australia on children's health conditions[17]. It is said that mothers as 'parents of experts' will basically always monitor the health condition of their children through education and information about health which currently uses a lot of technology in its spread. The mother is expected to adopt the results of research / useful information about children's health, and then it will be combined with her ideology. The result is that social media applications and networks that contain health information are very helpful for mothers in caring for children and during pregnancy.

In Indonesia, the use of social media by mothers who actually increase their chances of being ill can be explained in terms of the unequal allocation of time for internet use and social media. The time mothers spend

Table 2. Percentage of Child Health Indicators by Mother, Child, and Household Characteristics

Characteristics	Health Status		Exclusive Breastfeeding Status		Basic Immunization Status	
	Health (%)	Sick (%)	Yes (%)	No (%)	Yes (%)	No (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mother's using social media						
Yes	56,89	43,11	45,64	54,36	49,29	50,71
No	60,29	39,71	39,32	60,68	37,99	62,01
Mother's age group						
<30	59,63	40,37	38,90	61,10	39,66	60,34
30-34	58,62	41,38	42,42	57,58	40,52	59,48
35-39	59,79	40,21	42,32	57,68	40,24	59,76
40+	62,95	37,05	38,86	61,14	37,34	62,66
Marital status						
Married	59,68	40,32	40,78	59,22	39,92	60,08
Divorced	63,78	36,22	32,47	67,53	34,36	65,64
Death Divorced	59,47	40,53	35,77	64,23	30,59	69,41
Child ever born						
<3	58,45	41,55	40,81	59,19	42,96	57,04
3+	61,57	38,43	39,73	60,27	35,03	64,97
Education						
No primary	60,25	39,75	34,37	64,63	26,87	73,13
Primary	60,09	39,91	38,07	61,93	36,19	63,81
Secondary	58,58	41,42	39,98	60,02	41,20	58,80
Senior	58,92	41,08	42,02	57,98	44,87	55,13
University	62,11	37,89	44,97	55,03	41,90	58,10
Work status						
Yes	59,68	40,32	39,70	60,30	38,07	61,93
No	59,82	40,18	40,88	59,12	41,45	58,55
Child's sex						
Male	59,27	40,73	40,09	59,91	39,98	60,02
Female	60,26	39,74	40,71	59,29	39,45	60,55
Health insurance						
Yes	58,28	41,72	42,36	57,64	41,02	58,98
No	60,78	39,22	39,26	60,74	38,74	61,26
Quintile of expenditure percapita						
Quintile 1	63,31	36,69	39,85	60,15	34,38	65,62
Quintile 2	60,20	39,80	39,16	60,84	37,35	62,65
Quintile 3	59,78	40,22	40,26	59,74	38,68	61,32
Quintile 4	58,43	41,57	40,63	59,37	42,38	57,62
Quintile 5	57,04	42,96	42,04	57,96	45,83	54,17
Residence						
Urban	56,44	43,56	42,80	57,20	44,94	55,06
Rural	62,08	37,92	38,68	61,32	36,07	63,93
Health Service						
Yes	59,16	40,84	41,00	59,00	41,24	58,76
No	64,60	35,40	35,28	64,72	27,66	72,34

Note: ***=p<0,01, **=p<0,05, *=p<0,1
Source: Susenas 2015, Podes 2014 (author's process)

Table 3. Marginal Effect for the Three Child Health Indicator Model

	Health Status		Exclusive Breastfeeding Status		Basic Immunization Status	
Characteristics	dy/dx	Robust Std. Err	dy/dx	Robust Std. Err	dy/dx	Robust Std. Err
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mother's using social media						
Yes	-0,1353***	0,0324	0,0419	0,0563	0,1671***	0,0358
No (ref.)						
Mother's age (year)	-0,0007*	0,0004	0,0037***	0,0008	0,0048***	0,0005
Marital status						
Married	0,0217	0,0224	0,0267	0,0493	0,0591***	0,0249
Divorced	0,0680**	0,02711	-0,0420	0,0534	0,0009	0,0273
Death Divorced (ref.)						
Child ever born	0,0128***	0,0017	-0,0099***	0,0037	-0,0353***	0,0026
Education						
No primary						
Primary	0,0114	0,0084	0,0364**	0,0149	0,0774***	0,0109
Secondary	0,0105	0,0082	0,0529***	0,0159	0,1071***	0,0115
Senior	0,0354***	0,0083	0,0613***	0,0153	0,1143***	0,0111
University	0,0829***	0,0109	0,0822***	0,0164	0,0786***	0,0132
Work status						
Yes	-0,0138***	0,0046	-0,0232***	0,0077	-0,0223***	0,0057
No (ref.)						
Child's sex						
Female	0,0093***	0,0032	0,0067	0,0066	-0,0045	0,0039
Male (ref.)						
Health insurance						
Yes	-0,0218***	0,0053	0,0187**	0,0084	0,0079**	0,0075
No (ref.)						
Peer family	-0,0345***	0,0128	0,0528**	0,0248	0,0713***	0,0154
Expenditure percapita	-0,0196***	0,0049	-0,0220***	0,0079	0,0032	0,0072
Residence						
Rural	0,0387***	0,0066	-0,0126	0,0093	-0,0223**	0,0094
Urban (ref.)						
Health Service						
Yes	-0,0241**	0,0106	0,0377***	0,0142	0,0800***	0,0142
No (ref.)						
Immunization coverage	-	-	-	-	0,0005***	0,0001

Note: ***=p<0,01, **=p<0,05, *=p<0,1
Source: Susenas 2015, Podes 2014 (author's process)

on socializing the media actually reduces the quantity and quality of their time to care for children. This fact is in fact in line with previous research on indirect media and health relations[44]. One that has been done in Indonesia is through the mechanism of the value of social capital as an intermediary variable, where there is a relationship between media use and health. First, Olken (2009) which examines the impact of media in the form of television, whose use is increasingly widespread with respect to rural social capital in Indonesia[29]. The results showed that the expansion of television use by the community had an impact on the decrease in the level of trust among the population in the community group accompanied by a reduction in social activities and collaboration.

The decline in social capital is one of them due to the allocation of time to watch television which becomes more in line with the various programs displayed. Second, Sujarwoto and Tampubolon (2013) specifically examined the relationship between maternal access to social capital and child health in Indonesia[41]. Using the instrument variable this study obtained the main results which showed that maternal social capital was positively and significantly related to children's health. So if the mother's social capital has a direct relationship with children's health, and it is found that the use of media has a negative impact on social capital, it can be concluded indirectly that in Indonesia, mothers who access the media tend to have low social capital and have an impact on declining status health of his child.

In addition to social medical use by mothers who influence the health status of infants, other factors that influence are maternal age, maternal marital status (divorced life category), number of living children ever born to mothers, highest maternal education (equivalent high school and college graduation categories), maternal working status, sex of children under five, ownership status of under-fives health insurance, average ART of social media users other than mothers, average per capita expenditure, area of under-fives living, and the existence of health services (personnel and health facilities). The area of residence itself has a very large influence because it can reduce the influence of social media by half. As Subiyakto (2012) stated that urban areas have many social problems that adversely affect children's health such as poor quality of environmental resources including clean drinking water, green open space, non-smoking areas, affordable basic services, and security[40].

Then for breastfeeding indicator, social media is a variable that does not significantly affect exclusive breastfeeding. This generally indicates that breastfeeding behavior is basically a human right of a mother who is not limited by external factors such as the living environment[13]. One of the reasons for this is in cases where exclusive breastfeeding has no effect on mothers who cannot give breast milk to their babies for several medical reasons, such as illness in mothers who are at risk of contracting it to babies if breastfeeding is still done[22]. This allegation was supported in this study with the sample limited only to mothers who had ever been and still giving ASI to their babies. This was done because of the limitations of the questionnaire which did not contain the reasons for breastfeeding, so the researchers assumed that mothers who had never given ASI had certain medical reasons. Table 4 contains the value of marginal effects of mothers of social media users who have and still provide ASI.

Table 4. Coefficient and Marginal Effect Exclusive Breastfeeding Model for Mother Who Ever and Still Give Breastfeeding

Characteristics	Coef. (s.e)	dy/dx (s.e)
(1)	(2)	(3)
Mother's using social media		
Yes	0,3797** (0,1832)	0,1469** (0,0694)
No (ref.)		

Note: ***=p<0,01, **=p<0,05, *=p<0,1
Source: Susenas 2015, Podes 2014 (author's process)

The results show that the use of social media by mothers who have and still provide breast milk has a significant and positive influence on the status of exclusive breastfeeding against their children. Nevertheless, the majority of control characteristics in this model have

significant effects on exclusive breastfeeding of children under five years of age: maternal age, number of live births, maternal education (all categories), maternal employment status, health insurance under-five, average social media users besides mother, average of expenditure per capita, and existence of health service.

The socioeconomic characteristics of mothers play an important role in the success of exclusive breastfeeding for their children. This is in line with Astuti (2013) which shows that the socioeconomic characteristics of mothers such as maternal education, maternal employment, and mother's knowledge, coupled with the roles of support of husbands, families, health-care providers and even media proven to be linked in the process of exclusive breastfeeding to infants[3].

Then in the basic immunization model, it was shown that the use of social media by mothers proved to be significantly influential on the provision of complete basic immunization for infants. Where the use of social media by mothers will increase the chances of direct toddlers to get complete basic immunization of 16.71%. This considerable value and the positive relationship between the two at a significant level of 1% indicate that the promotion or dissemination of information about immunization in 2015 in Indonesia still has a positive impact and is in line with the expected goals of increasing the level and achievement of complete basic immunization as a national program. The role of internet media and social marketing is said by Opel, Diekema, Lee, and Marcuse (2009) to be constantly optimized[30], given the lack of knowledge about the use of social media for health is still a major obstacle now[12].

All control variables in the form of maternal characteristics used in this study were mother's age, mother's marital status, mother's education, and mother's working status which significantly affected the provision of complete basic immunization for toddlers. One of the factors that has a major influence is maternal education where the greatest additional value for toddlers getting complete basic immunization occurs in those with mothers with secondary and upper education (junior-high school equivalent). This is in line with the research of Vikram, Vanneman, and Desai (2012) in India, who also obtained the results that the influence of maternal education factors most often occurs when mothers complete secondary education[43].

Other factors that were significant and influential in the provision of complete basic immunization for children under five were ownership status of under-fives health insurance, social media users other than mothers, status of health services, area of residence, and national immunization coverage, while toddler sex and average expenditure per capita does not affect the provision of complete basic immunization for infants. In general, the majority of these results are in line with the findings of Bhuiya, BHUIY, and Chowdhury (1995) in Bangladesh who found that the presence of health facilities, maternal education, maternal age, child sex, radio exposure, and residential areas were statistically significant with receipt of immunization programs[6].

Discussion

From the results of the analysis, this study shows that maternal social media use has different influences and relationships on the three health status of children under five. First, the use of social media by mothers has a negative and significant effect on the chances of toddlers to be healthy (no pain complaints). Second, exclusive breastfeeding for children under five is not significantly affected by the use of social media by mothers. However, in the group of mothers who did and still provide ASI, the use of social media by mothers had a positive and significant influence on the chances of children getting exclusive breastfeeding. This captures the picture that exclusive breastfeeding efforts can be made by mothers who have no complaints / medical reasons. Third, the use of social media by mothers has a positive and significant effect on the chances of children getting complete basic immunization.

From the first point it can be said that in Indonesia, mother activities in the virtual world with the application of social media do not play a major role as a supporting media in the process of caring for children. The negative relationship can be caused by several reasons, for example, because health-related content is not the main goal of social media use by mothers. Mother's

leisure time also increases with the amount of time allocated by mothers to access social media, which results in a reduction in the quantity of time spent by mothers in caring for and maintaining children's health. In more specific goals, namely exclusive breastfeeding programs and complete basic immunization, social media is proven to be able to increase the knowledge of users about the health information that is being promoted. Mother's exposure to social media made her more aware of various public health issues and problems related to her baby's health.

Maternal characteristics in the form of age, marital status, number of living children who have been born, education level, and working status of the majority mother have an influence on their behavior in caring for their children's health, exclusively breastfeeding, and ensuring their complete immunization. Other characteristics such as ownership status of health insurance, other social media users in one household, per capita expenditure, the existence of health services and the area where the toddler lives varies have an influence on their health status. And most fundamentally, in Indonesia, toddler demographic characteristics such as gender do not affect them to obtain exclusive breastfeeding and complete basic immunization.

Policy Implications

The results of this study found that the use of social media in the mother is a factor that cannot be ignored in an effort to maintain child's health. Therefore, effort is necessary to improve mother's knowledge through health literacy activity through application and social media content where current technology and internet progressively faster. Educational and promotional programs should be supported by the government by providing as much health-related content as accessible to the public. However, the user's wise understanding and attitudes also need to be improved in using the internet and social media as a source of information.

The use of social media that requires the Internet network becomes a challenge for the government to ensure the equalization of infrastructure such as the presence of BTS and signal strength that specifically affect the accessibility of its use. Sufficient and equitable facilities throughout Indonesia are expected to have the same impact for all internet and social media users without being limited by the different conditions and areas of residence.

Acknowledgement

This study uses the main data from Susenas 2015 which first contains information specifically related to information and communication technology. However, the details of the question did not provide time allocation for use, so the study was not able to obtain a more specific picture of the utilization of technology and communication made by the mother.

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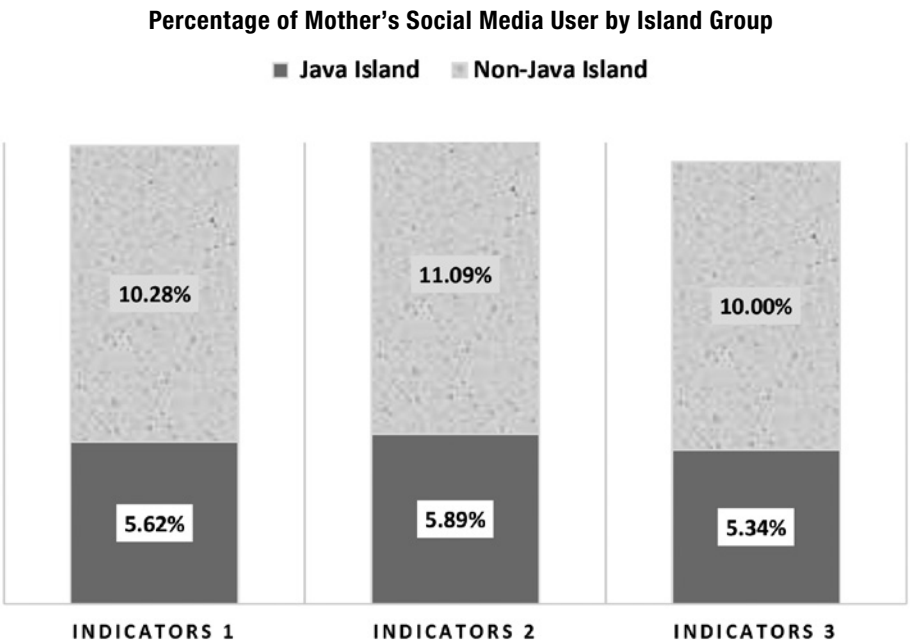
Appendix A



Appendix B

Sample Distribution according to Social Demographic and Economic Characteristics of Mother, Toddler, and Household

Characteristics	Indicators 1		Indicators 2		Indicators 3	
	Sample (n)	Percentage (%)	Sample (n)	Percentage (%)	Sample (n)	Percentage (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marital status						
Married	86161	97,35	23593	97,67	68734	97,12
Divorced	1665	1,88	425	1,76	1429	2,02
Death Divorced	681	0,77	137	0,57	608	0,86
Education						
No primary	7616	8,60	1964	8,13	6255	8,84
Primary	23339	26,37	6154	25,48	18949	26,78
Secondary	19053	21,53	5250	21,73	15128	21,38
Senior	25175	28,44	7187	29,75	19835	28,03
University	13324	15,05	3600	14,90	10604	14,98
Work status						
Yes	42307	47,80	10097	41,80	36111	38,97
No	46200	52,20	14058	58,20	34660	51,03
Child's sex						
Male	45662	51,59	12368	51,20	36626	51,75
Female	42845	48,41	11787	48,80	34145	48,25
Health insurance						
Yes	52125	41,11	8782	36,36	30504	43,10
No	36382	58,89	15373	63,64	40267	56,90
Residence						
Urban	36569	41,32	10009	41,44	29186	41,24
Rural	51938	58,68	14146	58,56	41585	58,76
Health Service						
Yes	78801	89,03	21573	89,31	62886	88,86
No	9706	10,97	2582	10,69	7885	11,14
The existence of BTS						
Yes	46563	52,61	12751	52,79	37161	52,51
No	41944	47,39	11404	47,21	33610	47,49
Signal Strength						
Strong	69325	78,33	19018	78,73	55288	78,12
Others	19182	21,67	5137	21,27	15483	21,88
Total	88507	100,00	24155	100,00	70771	100,00

Summary of Statistics on Characteristics of Numeric Variables

Characteristics	Indicators 1		Indicators 2		Indicators 3	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mother's age	31,1	6,85	30,1	6,88	31,5	6,77
Child ever born	2,5	1,51	2,4	1,47	2,52	1,52
Others social media user	0,096	0,18	0,099	0,18	0,095	0,18
Expenditure percapita	721,896,2	698891	715,387,8	670221	721,365,3	703310

Appendix C

Summary of Biprobit Regression Output in Toddler Health Status Model

VARIABLES	Stage a			Stage b			Stage c			Stage d		
	health_ status	socmed	athrho	health_ status	socmed	athrho	health_ status	socmed	athrho	health_ status	socmed	athrho
socmed	-0.767***			-0.751***			-0.622***			-0.355***		
	(0.0754)			(0.0752)			(0.0782)			(0.0866)		
age	-0.00427***			-0.00392***			-0.00277**			-0.00184*		
	(0.00108)			(0.00109)			(0.00109)			(0.00104)		
marital_ dummy1	0.0413			0.0434			0.0556			0.0568		
	(0.0585)			(0.0586)			(0.0586)			(0.0589)		
marital _ dummy2	0.176**			0.174**			0.172**			0.179**		
	(0.0705)			(0.0708)			(0.0711)			(0.0711)		
CEB	0.0408***			0.0409***			0.0356***			0.0335***		
	(0.00448)			(0.00448)			(0.00454)			(0.00441)		
educ_ dummy2	0.0208			0.0208			0.0257			0.0299		
	(0.0218)			(0.0218)			(0.0219)			(0.0220)		
educ_ dummy3	0.00385			0.00324			0.0150			0.0275		
	(0.0212)			(0.0211)			(0.0214)			(0.0215)		
educ_ dummy4	0.0468**			0.0488**			0.0712***			0.0930***		
	(0.0201)			(0.0201)			(0.0211)			(0.0219)		
educ_ dummy5	0.162***			0.171***			0.204***			0.218***		
	(0.0261)			(0.0262)			(0.0280)			(0.0289)		
work	-0.0297**			-0.0269**			-0.0283**			-0.0363***		
	(0.0123)			(0.0122)			(0.0123)			(0.0120)		
child_sex				0.0245***			0.0243***			0.0245***		
				(0.00825)			(0.00828)			(0.00845)		
health_ insurance				-0.0632***			-0.0585***			-0.0573***		
				(0.0135)			(0.0137)			(0.0140)		
peer_ family							-0.124***			-0.0907***		
							(0.0325)			(0.0336)		
percapita_ expense							-0.0580***			-0.0514***		
							(0.0127)			(0.0130)		
residence										0.102***		
										(0.0173)		
health_ service										-0.0634**		
										(0.0278)		
presence_ BTS		0.329***			0.330***			0.330***			0.332***	
		(0.0239)			(0.0239)			(0.0239)			(0.0238)	
signal		0.592***			0.592***			0.592***			0.590***	
		(0.0400)			(0.0400)			(0.0400)			(0.0398)	
Constant	0.317***	-1.686***	0.393***	0.288***	-1.685***	0.388***	1.001***	-1.686***	0.343***	0.733***	-1.686***	0.192***
	(0.0717)	(0.0260)	(0.0481)	(0.0727)	(0.0260)	(0.0477)	(0.180)	(0.0261)	(0.0478)	(0.183)	(0.0261)	(0.0491)
Observations	88,507	88,507	88,507	88,507	88,507	88,507	88,507	88,507	88,507	88,507	88,507	88,507

Robust standard errors in parentheses

*** p<0,01, ** p<0,05, * p<0,1