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# ANALYSIS OF COMMUNICATION NETWORKS ON THE EFFECTIVENESS OF IEC REGARDING CONTRACEPTIVE METHODS IN FAMILY PLANNING VILLAGE, GAHARU DISTRICT, MEDAN CITY

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**ABSTRACT**
There are numerous family planning village managers who are not responsible for implementing Bangga Kencana information, education, and communication, due to their lack of understanding and knowledge regarding the purpose and essence of the programme. This study aims to analyse the structure of communication networks, the relationship between individual characteristics and communication networks, and the relationship between communication networks and the effectiveness of the implementation of Information, Education, and Communication on contraceptive methods in Gaharu Family Planning Village. The research method employed is a correlational method utilising a population and a sample, specifically women of fertile aged 15-49 years and members of the toddler family building group, totalling 62 individuals. Data were collected via questionnaires and observations employing an ordinal scale to assess individual characteristics, interpersonal communication networks, and the effectiveness of Information, Education, and Communication on contraceptive methods. The results demonstrated the existence of cliques with a radial personal network structure. The actors who occupied the roles of stars, clicks, bridges, hubs, and cut-points were identified as family planning cadres and counsellor of family planning in Gaharu. Also, demonstrate a strong relationship between interpersonal communication networks and the effectiveness of communication implementation on contraceptive methods in Gaharu.

**Keywords:** Communication Network; Contraceptive Methods; Family Planning Village; Interpersonal Communication.

## INTRODUCTION

The results of the evaluation of family planning (KB) villages in Indonesia conducted by National Population and Family Planning Board (BKKBN) researchers in July 2017 indicate that the presence of KB villages is perceived as a means of attracting the attention of the community to a greater understanding of contraceptive tools and methods, reproductive health of adolescent, the age of first marriage, Generation Planned (GenRe), activity group that help family resilience, and population issues. Conversely, there are numerous KB villages whose existence is not perceived by the community. Of particular concern is the lack of comprehension among KB village managers regarding the fundamental principles and objectives of the KB village initiative (BKKBN, 2017). If the KB Village management itself lacks an understanding of the essence and purpose, then the question arises as to who is responsible for implementing *Bangga Kencana* information, education, and communication (IEC) in KB Villages, given the lack of understanding and knowledge of the KB Village managers regarding the purpose and essence of the programme. To date, no published studies on KB villages have investigated this issue in such depth. Instead, each study has focused on the operationalisation of variables and frameworks based on indicators of the success of KB villages.

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One analysis employs a distinct methodology from that utilized in the KB Village research, namely the development of communication network analysis from social network analysis. Network analysis is a research method that seeks to explain how social structures are formed through interactions or relationships between individuals and their impact on the formation of social structures, with the aim of understanding how they affect other phenomena (Chi, 2015). In essence, network analysis prioritises the examination of relationships that emerge subsequent to communication or interaction. Consequently, researchers are inclined to employ communication network analysis in identifying key actors whose roles can be leveraged to ensure the sustained viability of the programme in the KB Village. In addition to offering a novel approach, it is anticipated that the emphasis on diverse analyses, particularly those centred on the relationships between KB Village actors, will facilitate more nuanced and comprehensive conclusions.

A communication network analysis identifies the various roles that actors may assume, including components, cliques, bridges, hubs, cut-points and remotes. The objective of this labelling is to ascertain the role that a specific actor occupies. A component is defined as a grouping of actors (nodes) that have at least one relationship. In the event that the relationship is reciprocal, and there is more than one relationship, a clique will be formed. Bridges are actors that connect two cliques, while hubs are actors that have the greatest number of relationships. Cut-points are actors that act as a bridge between existing cliques; in the absence of such an actor, the two cliques will be detached. Finally, secluders are actors that do not have a single link (Eriyanto, 2014).

The application of communication network analysis has become a prevalent and sophisticated methodology across a range of analytical disciplines, offering insights into the intricate dynamics of complex phenomena. One such study was conducted by Hertanto et al. (2016) and entitled 'An Analysis of Communication Network Structure and the Role of Actors in the Implementation of Potato Cultivation Technology (Potato Farmers of Ngantru Village, Ngantang District, Malang Regency)'. The objective of the study is to illustrate the methods employed by farmers to obtain the information they require, as well as the structure of the network and the role of the actors within it. The sample was selected from a small group of farmers in Ngantang, with 80 group members interviewed. The results demonstrate that information dissemination is dominated by certain parties who play an important role in the group, such as the group leader. Furthermore, the role of connecting actors is more significant than that of the group leader, as individual factors and farming characteristics serve as crucial supporting factors.

The studies developed with communication network analysis demonstrate the effective flexibility of communication network analysis in analysing various fields with detailed and comprehensive patterns, thereby facilitating the unravelling of the root of the problem. This piques the interest of researchers in employing communication network analysis to examine the deployment of IEC on contraceptive tools/methods in KB villages, along with identifying the actors who act as bridges, hubs, cut-points and remotes. It is important to note that each piece of information conveyed will have different actors involved. For instance, those responsible for implementing IEC on population issues will differ from those involved in introducing contraceptives and from those who provide information on family development. It is for this reason that researchers have elected to focus the implementation of IEC on the family planning programme, namely contraceptives. This is because the principal objective of establishing KB villages is to reduce total fertility rate (TFR) and control population growth rates.

The KB Village was selected as the site for the research project due to its status as the primary location for the implementation of all programmes, and as a result, it has become the focal point for all relevant parties. In selecting the KB Village as the site for this study, the researcher considered the successful implementation of the programme to be a prerequisite, as the network analysis will not be illustrative if the programme has not been operational. In light of the aforementioned considerations, the researchers selected Gaharu Family Planning Village in Medan City, which was inaugurated on 19 July 2017. The village is situated in Neighbourhood 9, Gaharu Village, East Medan Sub-district, Medan City, in close proximity to the railway tracks and characterised by a relatively high population density. Neighbourhood 9, which was selected as the location for the KB Village, has a population of 1,284 individuals distributed across 332

households. In the social context of Gaharu KB Village, there are still instances of children dropping out of school due to economic constraints. Additionally, 76 children lack birth certificates due to financial limitations. Furthermore, domestic violence, juvenile delinquency, and other social issues persist (BKKBN, 2017).

Based on the various backgrounds and studies above, the objective of this study is to analyse the structure of communication networks, the relationship between individual characteristics and communication networks, and the relationship between communication networks and the effectiveness of the implementation of Information, Education, and Communication on contraceptive methods in Gaharu Family Planning Village, Medan City.

## METHOD

The study was conducted in July 2020 at Gaharu KB Village, East Medan Subdistrict, Medan City, North Sumatera Province. The study population comprised all families with children under the age of five who were members of the toddler family development group. The selection of research respondents was conducted through the use of quasi-sociometric and total sampling techniques. The unit of analysis in this study was the individual family unit comprising children under the age of five. The research was conducted through observation and in-depth interviews, with the use of questionnaire instruments. This study employed the free recall method to analyse the communication network between KB village managers and mothers of children under five. Respondents were asked to recall and mention with whom they communicated or obtained information about contraceptive tools/methods. The data was processed using the UCINET 6 software for communication network analysis and the SPSS 23.0 software for the analysis of the relationship between variables. The Spearman rank correlation analysis method was employed for this purpose.

## RESULTS

### Individual Characteristics

Table 1 Individual Characteristics.

| Category | Frequency | Percent |
|---|---|---|
| **Age** | | |
| 15-26 Years Old | 10 | 16,1 |
| 27-38 Years Old | 20 | 32,3 |
| 39-50 Years Old | 32 | 51,6 |
| **Number of life Birth** | | |
| 1 Person | 18 | 29,0 |
| 2 Person | 16 | 25,8 |
| 3 Person or More | 28 | 45,2 |
| **Last Education** | | |
| College (D.I-S3) | 10 | 16,1 |
| High school/equivalent | 34 | 54,9 |
| Junior high school/equivalent | 16 | 25,8 |
| Elementary school/equivalent | 2 | 3,2 |
| **Occupation** | | |
| Self-employed | 2 | 3,2 |
| Private employee / labourer | 11 | 17,8 |
| Not working / housewife | 49 | 79,0 |
| **Income per month** | | |
| < Rp 1.000.000,00 | 10 | 16,1 |

| | | |
|---|---|---|
| Rp 1.000.001,00 - Rp 2.000.000,00 | 38 | 61,3 |
| > Rp 2.000.001,00 | 14 | 22,6 |
| **Total** | **62** | **100** |
| **Administrative Card Ownership** | | |
| Identity Card (KTP) | 60 | 96,8 |
| Family Card (KK) | 60 | 96,8 |
| Marriage Card | 58 | 93,5 |
| Insurance (PBI/Non-PBI) | 26 | 41,9 |

Source: Research Results, 2020.

The results in the table above show that more than half, 51.6 percent to be exact, of the respondents are between 39 and 49 years old, while mature respondents in the age range of 27-38 years are 32.3 percent and the rest are young in the range of 15-26 years. If the age of the respondents is dominated by old age, then the number of live-born children is also dominated by 3 or more, namely 45 percent, while respondents who have 2 children amount to 29 percent and 26 percent have 1 child. 54 percent of the 62 respondents had high school education, 25.8 percent had junior high school education, 16.1 percent had college education, and the remaining 3.2 percent had only elementary school education.

Then, 79 percent of the respondents worked as housewives or did not work. While activities that can be done while taking care of their toddlers are small-scale selling or self-employment and this choice is made by 3.2 percent of women of reproductive age (WUS) and the rest choose to continue working as private employees or laborers such as washing clothes in people's homes, becoming teachers and others as much as 17.7 percent. The monthly income for PUS is either the income of the woman plus her husband, or if the woman does not work, then the income is only the husband's income. It can be seen that the monthly income of PUS is generally in the range of IDR 1,000,000 to IDR 2,000,000 at 61.3 percent, while those who have an income of 3,000,000 IDR and above are 22.6 percent and the rest have an income below IDR 1,000,000.00 at 16.1 percent.

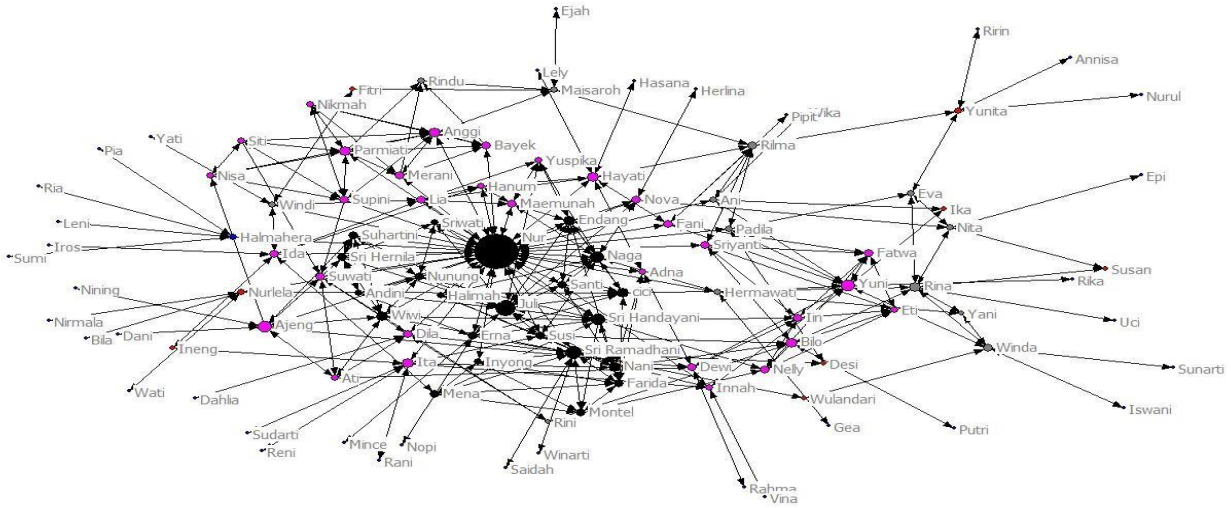
One of the indicators that contributes to family welfare is the ability to access facilities provided by the government, therefore it is necessary to have administrative records as a basis for providing access. The possession of KTP, KK and marriage card is considered good because all family members already have them, and specifically for the marriage card, the PUS already has it. The percentage of the whole family having administrative files is 96.8 percent for KTP and KK, while the percentage of PUS having a marriage card is 93.5 percent. Contrary to the case of insurance, because 58.1 percent of respondents still do not have insurance, both those who receive contribution assistance and those who do not receive contribution assistance, while women of reproductive age (WUS) who have it is only 41.9 percent. In particular, the facilitation of insurance coverage must continue to be maximized in order to help the community access government-provided health facilities.

**Analysis of the Communication Network in the IEC on Contraceptive Devices/Methods**

The sociogram, constructed from the interpersonal communication network, reveals that no single actor is devoid of relationships or isolated, particularly in the context of discussions pertaining to contraceptives or contraceptive methods. However, it is notable that several actors outside of BKB members play a significant role in the dissemination of information about contraceptive tools and methods. The most influential opinion leader is actor number 6, Nur, who exhibits a considerably higher level of centrality than the other actors. Nur is a family planning cadre who also serves as a neighbourhood head in Neighbourhood IV of Gaharu Village. Nur

currently resides in the Gaharu KB Village Data House, which is located in neighbourhood IX, where Gaharu KB Village is situated. All actors involved in this network are acquainted with Nur, who frequently extends invitations to them to participate in activities within the KB Village. Additionally, Nur serves as a cadre at the Health Integrated Post (Posyandu) due to her tenacity in encouraging mothers in Gaharu KB Village to become equally involved.

Figure 1 Sociogram of Communication Network Analysis on Contraceptive Tools/Methods (Modified based on In/Out Degree).




Source: Research Results, 2020.

The results of the analysis using UCINET 6 yielded a density result of 0.0418 or equal to 4.18 percent. This indicates that the average relationship between BKB group participants in Gaharu KB Village is still low compared to the maximum relationship of 100 percent. However, the standard deviation of the processed data is 0.2002, which means that when the standard deviation is smaller and below "0", the stability of the data is better and more stable and can be concluded to be valid. The relationship between actors that is classified as low is concluded evenly throughout the relationship that exists in BKB Kampung KB group in Gaharu Village in the implementation of IEC on contraceptive tools/methods.

Table 2 Degree of Centrality of Communication Networks on IEC on Contraceptive Tools/Methods.

| Centrality Degree | Actor | Score | Role |
|---|---|---|---|
| Indegree Centrality | Actor Number 6 | 0,351 | Family planning cadre |
| | Actor Number 14 | 0,153 | BKB Member |
| | Actor Number 7 | 0,117 | PKK Mother |
| | Actor Number 30 | 0,099 | BKB Member |
| | Actor Number 27 | 0,081 | BKB Member |
| Outdegree Centrality | Actor Number 6 | 0,351 | Family planning cadre |
| | Actor Number 14 | 0,153 | BKB Member |
| | Actor Number 7 | 0,117 | PKK Mother |
| | Actor Number 30 | 0,099 | BKB Member |
| | Actor Number 27 | 0,081 | BKB Member |
| Closeness Centrality | Actor Number 6 | 0,860 | Family planning cadre |
| | Actor Number 4 | 0,760 | BKB Member |

| | | | |
|---|---|---|---|
| | Actor Number 39 | 0,751 | BKB Member |
| | Actor Number 31 | 0,751 | BKB Member |
| | Actor Number 16 | 0,748 | BKB Member |
| Betweenness Centrality | Actor Number 6 | 0,612 | Family planning cadre |
| | Actor Number 7 | 0,086 | PKK Mother |
| | Actor Number 27 | 0,072 | BKB Member |
| | Actor Number 21 | 0,069 | BKB Member |
| | Actor Number | 0,069 | Family Planning Extension worker |

Source: Research Results, 2020.

Based on the analysis results, we can see that the highest eigenvector value is 0.517 and the lowest is 0.000. The five actors with the highest degree of relationship are actor number 6 named Nur (value: 0.500), actor number 14 named Juli (0.256), actor number 30 named Naga (0.211), actor number 4 named Cici (0.175) and the fifth actor number 93 named Sri Handayani (0.175). While the actors who have the least relationship are actors number 70, 71 and 72 named Nurul, Ririn and Annisa respectively with an eigenvector centrality value of 0.001.

The next analysis is actors who act as stars, clicks, bridges, hubs, cutpoints and remoters. To find actors who act as stars, there is in-degree centrality, a measure used to see how popular an actor is. While the measure taken to find hubs is out-degree centrality, which is the breadth of the network owned by the actor. Processing the data with Network>Centrality and Power>Degree produces both in-degree and out-degree, and it turns out that both have no significant difference (see Table 4.3). The actors who have the most extensive network are actor number 6 named Nur (value: 0.351), actor number 14 named Juli (value: 0.153), actor number 7 named Sri Ramadhani (0.117), actor number 30 named Naga (0.099) and actor number 27 named Yuni (0.099).

Based on the results of the analysis, role as bridge is played by actor number 6 (Nur) with a value of 0.860, actor number 4 (Cici) with 0.760, actors number 39 and 31 (Fani and Fadila) with 0.751 each, and actor number 16 (Sriyanti) with 0.748. Actors who always appear both in giving and receiving information as well as being the main actors giving and receiving information are Nur, who serves as a KB cadre, and Cici, who serves as a BKB member.

The actor who also has a role in facilitating the group of actors in the network (betweenness) and comes from outside the second group is actor number 17 named Rilma. Rilma is a family planning field educator assigned to Medan Timur subdistrict with the target location of Gaharu District. She does not live in the IX Gaharu neighbourhood, but she did provide some materials on contraceptive methods and supplies, so some group members received contraceptive information from this actor. Her presence at each BKB activity was also an opportunity to foster interpersonal communication with her. The actor who actually came from the network but had a different role in the BKB group was actor number 7 named Sri Ramadhani. In addition to acting as an opinion leader in the interpersonal communication network on contraception, this actor also acts as the wife of the neighbourhood leader and joins the PKK Cadres.

**Relationship between individual characteristics and communication network analysis**

Before carrying out cross-tabulation and correlation tests, the researcher first grouped each characteristic, network value and IEC effectiveness into 3 categories each to obtain symmetrical matrix processing. These groupings were each explained in the operational definition with rationalisation. The researcher found it difficult to categorise the respondents' characteristics into three ordinal categories due to the lack of journals that categorise characteristics as expected in this study. By following the rational considerations and guidelines carried out by BKKBN and

BPS, the researcher selected the existing categories with the level of rationalisation that the researcher concluded. Specifically for the grouping of centrality values in the communication network, the researcher divided the range of the highest and lowest value limits with quartile values. The first and second quartile limits are used as low categories, the second quartile as medium category and the third and fourth quartile as high categories.

For each network, nine characteristics were tested for out-degree, in-degree, closeness and betweenness centrality. Based on the results of the crossover and correlation tests between these two variables, age is the only individual characteristic that has a relationship with the value of the actor's ability to spread information in the network (out-degree) and the degree of information received by the actor. This means that the older an actor is, the higher his ability to transmit information to other actors in the interpersonal network, and vice versa, the younger the age of an actor, the lower his ability to transmit information to other actors in the same network. The same is true for the relationship between age and the value of receiving contraceptive information from actors, i.e. the older the age of an actor, the higher the intensity of receiving contraceptive information and the younger the age of the respondent, the lower the intensity of accepting contraceptive information from the actor.

The relationship between individual characteristics and closeness centrality, or the degree of proximity between actors without going through intermediaries, has a stronger and more diverse relationship when compared to age level. There are five individual characteristics that have a relationship with the level of closeness in the network, namely age, number of children born alive, level of ownership of KTP and level of ownership of KK. The level of age has a significant relationship with the level of closeness of actors in the interpersonal communication network at two levels of significance. As discussed in the previous discussion, the increasing level of understanding of contraception among older actors also affects their ability to form networks without going through intermediaries. Simply put, the older the actor, the higher the level of ability to form a network directly with other actors, and vice versa, the younger the age of an actor, the lower the direct relationship with actors in the same network.

Further testing was done by summing the total number of individual trait scores and the total number of interpersonal communication network scores. The results of the summation were tested using Spearman Rank Correlation and the results are shown in Table 3 below.

Table 3 Correlation of Individual Characteristics with Interpersonal Communication Networks.

| | | | **Individual Characteristics** | **Interpersonal Communication Network** |
|---|---|---|---|---|
| Spearman's rho | Individual Characteristics | Correlation Coefficient | 1.000 | .782** |
| | | Sig. (2-tailed) | . | .000 |
| | | N | 62 | 62 |
| | Interpersonal Communication Network | Correlation Coefficient | .782** | 1.000 |
| | | Sig. (2-tailed) | .000 | . |
| | | N | 62 | 62 |

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Processed Data, 2020.

Overall, individual characteristics have a high and strong significant relationship with interpersonal communication networks regarding contraceptive tools/methods in Gaharu KB Village, Medan City. The correlation coefficient using Spearman Rank is 0.782 with a significance level of two (0.01).

**Relationship between interpersonal communication network and effectiveness of IEC on contraceptive tools/methods**

To test the relationship between communication networks and the effectiveness of IEC on contraceptive tools/methods, the process of summing all the scores of the questionnaire results on the actor's understanding of contraception begins, then the researcher divides the range of the summed scores into 3 parts in quartiles. The first quartile was classified as low, the second quartile as medium and the third quartile as high. Based on the results of cross-tests and correlations with each level of centrality, positive results were obtained, meaning that there is a relationship between communication networks and the effectiveness of IEC implementation on contraceptive devices/methods. The ability to provide information through relationships with other actors (out-degree), the ability to receive information through relationships (in-degree), the ability to form relationships directly with actors (closeness) has a significant relationship with the effectiveness of IEC on contraceptives and methods in Gaharu KB village. While the ability to facilitate actors in the network (betweenness) has a low but significant relationship with the effectiveness of IEC on contraceptive tools/methods.

Table 4 Correlation between Interpersonal Communication Network and Effectiveness of Contraceptive Tools/Methods.

| | | | Interpersonal Communication Network | Effectiveness of IEC on Contraceptive Tools/Methods |
|---|---|---|---|---|
| Spearman's rho | Interpersonal Communication Network | Correlation Coefficient | 1.000 | .746** |
| | | Sig. (2-tailed) | . | .000 |
| | | N | 62 | 62 |
| | Effectiveness of IEC on Contraceptive Tools/Methods | Correlation Coefficient | .746** | 1.000 |
| | | Sig. (2-tailed) | .000 | . |
| | | N | 62 | 62 |

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Processed Data, 2020.

**DISCUSSION**

The initial noteworthy aspect of the individual characteristics collated in this study is the trajectory of the actors' age. It should be noted that the Bina Keluarga Balita activity group is specifically aimed at families with children under the age of five. Consequently, all members of the activity group who are also actors in this study still have babies under the age of five. However, more than half (51%) of the subjects were aged between 39 and 50 years (49 years). During the data collection period, the researcher observed that several actors were carrying toddlers with an advanced age related appearance. The researcher therefore confirmed whether the child was the actor's own child, and the actors confirmed that the toddler was indeed their child.

A comparison of the data from the Gaharu KB Village data house with the results of the aforementioned study reveals that the dominant age of the population falls within the 36-40 and 41-45 age range (Data House, 2019). Comparison with data on the number of children born alive reveals that the majority of actors have three or more children (up to a maximum of six children). This age range is conducive to having more than three children, although the tendency to have toddlers still occurs. This is a crucial point that warrants careful consideration. If an inappropriate approach is taken, it could have a detrimental impact on family conditions, including the health of mothers and young children. The age range of 39-50 years is not optimal for women to become pregnant again and have toddlers.

The subsequent characteristic that was subjected to particular scrutiny was the profession and monthly income of the actors and their spouses. The actors involved in this study are predominantly housewives, who are presumably not engaged in remunerated employment due to their childcare responsibilities. Consequently, the family income levels of these actors are generally within the range of one to two million rupiah. Furthermore, it can be inferred that this income is derived exclusively from the earnings of the husbands through their professional endeavours. A comparison of the average income of the families of actors participating in the BKB Gaharu KB Village with the regional minimum wage of Medan City reveals that it remains below the minimum wage of IDR 2,037,000 (BPS, 2018).

Income is a key indicator in the classification of family groups according to their level of prosperity. The income of the actors' families, which remains below the Medan City minimum wage, is corroborated by data from the Data House of Gaharu KB Village. This data includes 125 households that have joint financial management (BKKBN, 2017), which are included in the Prosperous Family 1 group (Data House, 2019). A closer examination reveals that only two or three of the houses are permanent structures, while the remainder are semi-permanent with cement floors. These observations suggest that the research data aligns with the characteristics of the community residing in Gaharu KB Village, Medan City.

The data on community conditions based on education, as presented in the Gaharu KB Village Data House (2019), reveals that the majority of residents (623 individuals) have attained a high school education level, while 265 residents have completed junior high school. This population grouping based on education represents an ongoing data set, which means that it is possible that some individuals in the data set are currently engaged in educational activities. However, when compared to the description of the last education undertaken by actors in the interpersonal communication network, the research data also demonstrated a similar outcome. The majority of BKB Gaharu members have attained a level of education equivalent to that of high school, with the second largest group having completed junior high school. The Data of Indonesian Demographic and Health Survey (SDKI) in 2017 indicates that the educational attainment of women of reproductive age (WUS) in urban areas is higher than in rural areas, with an average level of upper secondary education. The accuracy of measuring the characteristics of respondents was reaffirmed in accordance with the conditions found in the field.

The concept of KB Village management is not the sole responsibility of BKKBN or the Population Control and Family Planning Office (DP2KB) in each district/city; rather, it should be a collaborative effort involving any agency with a stake in the village. In light of the fact that the location designated as a KB Village is characterised by slum-like conditions and underdevelopment, it falls upon the Public Works Office to construct public facilities and infrastructure in the area. Alternatively, the Population and Civil Registry Office is responsible for ensuring the collection of data pertaining to all community members in the form of identity card and family card KTP, KK and other population identity cards. In the technical guidelines for KB villages (BKKBN, 2017), it is recommended that the work of KB villages should be the joint responsibility of all related parties, including the private sector, in order to ensure a unified focus on the development of the village. One of the key responsibilities of the KB Village manager is to ensure the availability of accurate community population data records. This is crucial for enabling these communities, which are often underdeveloped and face significant limitations, to access the rights and services that the government is obliged to facilitate.

The ownership of identity cards, family cards, marriage cards and insurance does not appear to be a pertinent factor in this research. However, the provision of facilities for the management of these documents is anticipated to be utilised as a conduit for disseminating information by certain parties, thereby facilitating the formation of networks within the community. The ownership of KTPs, KKs and marriage cards among actors in the communication network in the

Gaharu KB Village has reached over 90%. A review of the PLKB report in Gaharu Village reveals that the increase in population documents occurred following the declaration of the KB Village.

A slightly different condition can be observed with regard to the ownership of insurance, both PBI and non-PBI, as well as other insurance. It is notable that a significant proportion of actors within this network, specifically 58.1%, lack any form of insurance coverage. In the North Sumatera only 28 percent of women and 24 percent of men have PBI BPJS, while only 21 percent of women and 24 percent of men use non-PBI BPJS. A mere 2% of women and 1% of men utilized company-sponsored insurance, regional health insurance, and private health insurance, respectively. Conversely, 47% of women and 45% of men remain uninsured (SDKI, 2017). Therefore, the findings of this research remain pertinent to the circumstances of the North Sumatera community, serving to reinforce the necessity for the implementation of a dedicated policy that can foster and facilitate public interest and engagement in the utilisation of insurance as a means of healthcare provision.

**Communication Network Analysis**

Based on the three actors who have a role in forming this network, the concept of opinion leaders is always identified with the mechanistic society (Jaali, et al., 2013; Hasanah, 2017; Hertanto et al., 2016), but this is not the case in Gaharu KB Village, Medan City. Gaharu village is very close to the centre of Medan City as the provincial capital, but the strength of the role of opinion leaders with the same characteristics as rural communities is still found. If in rural communities opinion leaders are village heads or traditional leaders, religious leaders or people with supernatural abilities, in the contraceptive information dissemination network in Gaharu KB village they are actors with administrative legality such as neighbourhood heads, cadres, PKK women or field extension workers.

Analysis of the location of actors with a high degree of centrality generally live in Block B. As an illustration, Neighbourhood IX, where Gaharu KB Village is located, consists of 14 blocks with an elongated pattern following Jalan Gaharu, with the boundaries of Gaharu Baru Alley junction to Harmoni Alley on the left and the boundaries of Timor Alley and School Alley on the right. Data House and the Gaharu District office are located in Block B, between Gaharu Baru Alley and Harmoni Alley. As mentioned earlier, actor number 6 (Nur), actor number 14 (Juli), actor number 30 (Naga) and actor number 27 (Yuni) live in Block B next to actor number 6 with high centrality, also next to Data House and Gaharu District office. If this study is to be further explored, it is interesting to follow up and deepen it by paying attention to how the relationship between location and network strength or how the influence of actor proximity to opinion leaders in improving interpersonal communication networks.

If high in-degree and out-degree are played by the same actor, in contrast to closeness centrality or the closeness of the actor's relationship with other actors in the interpersonal communication network, there are several other actors who did not appear before, such as actor number 4 (Cici), actor number 39 (Fani), actor number 31 (Fadila) and also actor number 16 (Sriyanti). The role of these four actors in the BKB group is that of ordinary members who are not elected as BPH or in charge of specific tasks, but in the network that is formed they are very close to other actors when discussing contraceptive tools and methods in the interpersonal realm. Compared to the results of Xu (2018) research with his colleagues, the role of communication with the doctor's emotional involvement with patients who have been condemned to not live long has a great impact on increasing their enthusiasm for the rest of their lives. This means that emotional closeness is an important asset for communication effectiveness, and the four actors can be used as actors to help other actors understand and even use certain contraceptive tools/methods.

Actor number 17, Rilma, who works as a family planning counsellor, has an important role as a mediator between the two groups of actors. This actor's name only appears when it is related to

the ability to connect the two network groups. In fact, Rilma is not better known than actor number 6 (Nur) and actor number 7 named Sri Ramadhani, but her ability to get closer to each group of actors in the network is a considerable opportunity to do IEC more intensely, because the information she shared was received by the actors in the network. Ale et al. (2014) found that all relationships established among university alumni in the United States (US) were positively correlated with the presence of support and empathy among actors with active communication. Jun et al. (2010) also found that the circulation of global information flows, the type of information spread is controlled by actors with good facilitation capabilities between different countries, so that information spread is one of the factors that make the US a sister country.

**Relationship between individual characteristics and communication network analysis**

Individual characteristics in the form of education level, employment level, income level, number of children born alive, ownership of KTP, KK, marriage card or insurance were found to be unrelated to the level of the actor's ability to share contraceptive information and the acceptance of contraceptive information. This means that the actor's ability to form and receive networks is not influenced by the actor's level of employment, whether low or high, nor by the level of income earned, whether low or high. This is also true for the number of live-born children an actor has, because it is possible that a low or low number of children also has a low or high ability to form networks. The same results are also found by Rahmawati (2016), when analysing the communication network in *pamelo* orange production and marketing, found that none of the characteristics such as age, duration of work, etc. are correlated with the existing network.

Several studies have examined how the characteristics of ID cards, family cards, marriage cards and insurance ownership are associated with actor networks. In any health-related survey, such as the Indonesian Demographic and Health Survey (SDKI) and the National Medium-Term Development Plan Survey (SRPJMN), now called the KKBPK Programme Accountability Performance Survey (SKAP), the availability of civil records and national health insurance (JKN) are always used as indicators to measure respondent characteristics. One of the criteria for family well-being is the existence of a civil registration record and access to health facilities, so the researchers concluded that these characteristics should be used as indicators. The results showed that having a civil registration record and a JKN did not affect the ability of actors to form and accept contraceptive networks.

Another interesting point of discussion in the level of closeness is the low but definite relationship between the number of children owned by the actor and the level of closeness with other actors, i.e. the higher the number of children owned by the actor, the higher the ability to form a network without intermediaries, and vice versa, the lower the number of children owned by the actor, the lower the ability of the actor to form direct relationships with other actors. Ownership of KTP and KK shows a small but significant relationship with the degree of closeness of actors in the interpersonal communication network regarding contraception. This means that if all eligible family members have an ID card and all family members are registered in the KK, the higher the actor's ability to build relationships without going through other actors, and if all family members do not have an ID card and are registered in the KK, the lower the actor's ability to build relationships directly with other actors in the interpersonal communication network about contraception. So far, the researchers have not found any specific studies that support the existence of this result, but specific studies need to be conducted to discuss whether this significance can be applied in general. Meanwhile, the results showed that characteristics such as level of education, occupation, income, possession of a marriage certificate and insurance had no positive or negative relationship with the degree of closeness.

When two groups of actors have no relationship with each other, the role of a facilitator is needed to connect the circulation of information flows between them. In network analysis, the role of this intermediary is seen from the level of the actor's betweenness, i.e. the higher the betweenness of

the actor, the greater the role in connecting two groups of actors that are not connected. Of the 5 actors with the highest betweenness value, only 2 of them act purely as members of the BKB Gaharu KB Village.

### Relationship between interpersonal communication network and effectiveness of IEC on contraceptive tools/methods

Theoretically, communication networks have a significant relationship with the spread of any information. This theory has been proven by Fitriani (2017) in his research on the dissemination of Islamic films to the people of Yogyakarta. The results of his research show that the most popular actors are those who have many communication networks. Similarly, network analysis has an impact on recent events, as Choudhary and Singh (2016) found terrorist networks in the WTC building on 11 September 2001 and managed to find actors who have the most networks. Some studies using new media are also considered successful in mobilising and rallying the masses because they publish many posts (Dunbara et al., 2015; Hellsten et al., 2018; Yang et al., 2017; Yang, 2018).

## CONCLUSION

Based on the results of the data analysis, it is concluded that Individual characteristics have a strong relationship with the interpersonal communication network regarding contraceptive tools/methods in Gaharu Family Planning Village. The age of the actor has a significant relationship with the popularity of the actor (in-degree centrality), the ability to establish relationships with other actors (out-degree centrality) and the ability to establish relationships with other actors without intermediaries (closeness centrality). The number of children born alive, possession of an identity card and possession of a family card have a weak but clear relationship with the ability to communicate without intermediaries (closeness centrality). Having national health insurance has a low but significant relationship with the ability to maintain a flow of information between two actors or two groups of unrelated actors (betweenness centrality). Interpersonal communication networks have a strong relationship with the effectiveness of implementing communication, information and education (IEC) on contraceptive tools/methods in Gaharu KB village. Out-degree, in-degree and closeness centrality have a significant relationship with the effectiveness of the implementation of IEC on contraceptive tools/methods. While betweenness centrality has a low but clear relationship with the effectiveness of IEC implementation on contraceptive tools/methods

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