

Knowledge Enhancement on Lung Cancer and The Disease Prevention for People of Selokaton, Gondangrejo, Karanganyar

¹Mirah Rejeki, ²Umi Kartikawati

Universitas Kusuma Husada Surakarta

Email: ¹Mirah.rejeki@gmail.com, ²kartikaumay2016@gmail.com

Article Info

Submitted: 18 June 2020
Revised: 4 August 2020
Accepted: 5 September 2020
Published: 12 December 2020

Keywords: Degenerative Disease, Lung Cancer, Knowledge Enhancement, Community Development

Kata Kunci: Penyakit Degeneratif, Kanker Paru-Paru, Peningkatan Pengetahuan, Pengembangan Masyarakat

Abstract

Degenerative Disease contributes 63% of dead worldwide. It counts for 36 million people's death every year. The prevalence number of the disease in Indonesia increases constantly. Lifestyle and food consumption habit are identified as two reasons why the disease takes place. One type of the diseases is cancer, where according to the data of World Health Organization, this is the second highest reason of death after cardiovascular disease. Type of cancer with the highest incidence and the top reason of death is lung cancer. In Karanganyar, according to the Health Department data, the occurrence of lung cancer increased from 1 case in 2016 to 5 cases in 2017. This increment alerts the urgent need for prevention and treatment of the disease. The lack of knowledge about lung cancer is the main reason leading to a possible high prevalence number. Based on the situation, the people knowledge about the lung cancer needs to be enhanced. This community development program was set up to achieve that objective through activity of presentation, discussion, and consultation. It involved 36 people in the age of 30-65 year old selected by the local government of Selokaton. The knowledge improvement of the attendees was assessed using pre-test and post-test. It was measured that the knowledge of participants increases from 4.58 at pre-test to 8.53 at post-test. This may indicate their interest on the program. It is expected that their knowledge will motivate then changing lifestyle in order to prevent the disease.

Abstrak

Penyakit degeneratif menyumbang 63% kematian di seluruh dunia, terhitung 36 juta orang mati setiap tahun. Angka prevalensi penyakit di Indonesia terus meningkat. Gaya hidup dan kebiasaan konsumsi makanan diidentifikasi sebagai beberapa alasan mengapa penyakit tersebut terjadi. Salah satu jenis penyakitnya adalah kanker, di mana menurut data Badan Kesehatan Dunia (WHO), penyebab kematian tertinggi kedua setelah penyakit kardiovaskular. Jenis kanker dengan

kejadian tertinggi dan penyebab kematian tertinggi adalah kanker paru. Di Karanganyar, menurut data Dinas Kesehatan, kejadian kanker paru meningkat dari 1 kasus pada tahun 2016 menjadi 5 kasus pada tahun 2017. Peningkatan ini menunjukkan perlunya pencegahan dan pengobatan penyakit yang mendesak. Minimnya pengetahuan tentang kanker paru-paru menjadi penyebab utama kemungkinan tingginya angka prevalensi. Berdasarkan situasi tersebut, pengetahuan masyarakat tentang kanker paru perlu ditingkatkan. Program bina lingkungan ini dibentuk untuk mencapai tujuan tersebut melalui kegiatan presentasi, diskusi, dan konsultasi. Melibatkan 36 orang berusia 30-65 tahun yang dipilih oleh pemerintah daerah Selokaton. Peningkatan pengetahuan peserta dinilai menggunakan *pre-test* dan *post-test*. Diukur bahwa pengetahuan peserta meningkat dari 4,58 pada *pre-test* menjadi 8,53 pada *post-test*. Ini mungkin menunjukkan ketertarikan mereka pada program. Ilmu yang dimiliki diharapkan dapat memotivasi untuk kemudian merubah gaya hidup guna mencegah penyakit tersebut.

1. INTRODUCTION

Degenerative Disease is the disease related with reduction of organ performance leading to the worsening person's health condition. This disease normally appears because people get older. The cells of person change, and this affects the organ's performance in general. Age is the main reason of the presence of degenerative disease. When a person is getting older, his organ and tissues become less functional. Therefore, it may be seen why old people can be more vulnerable to degenerative disease. However, this disease can also present to a person for the wide age range. Lifestyle, history of disease, and genetic factor are some reasons associated with the case of generative disease (Abdel-Daim *et al.*, 2019).

Degenerative disease may be classified into 3 main groups, cardiovascular, neoplastic, and neuro-system. The most common cardiovascular diseases are hypertension, coronary disease, and myocardial infarction. Neoplastic diseases include tumor and cancer. The disease that affects neural system includes Parkinson and Alzheimer. The number of people in the world suffering from degenerative diseases is getting bigger. Cancer is one of the diseases that takes significant number (Weiderpass, 2010). This disease is related to abnormal cell growth potential to invade or spread to other parts of the body. This contrast with benign tumor that

does not spread. The abnormal growth of cells in a specific organ normally indicates clinical symptoms. Therefore, cancer is named based on where the abnormal cells grow. In some countries, cancer is the main reason of death (Travis *et al.*, 2015).

One of the cancers is lung cancer where according to the data of the World Health Organization 2010, this disease has caused 63% of death on the global level. This number is equal to the death of 36 million people per-year. In Indonesia, the prevalence number of lung cancer constantly increases according to the data of Riskesdas (*Riset Kesehatan Dasar/Basic Medical Research*) at the year of 2007, 2013, and 2018 (Lin *et al.*, 2017). Going to the more specific area of Karanganyar regency, at the year of 2017 data from the Health Department indicates the majority of degenerative disease, which the people of Karanganyar are suffering from is Diabetes Mellitus, Insulin-dependent Diabetes Mellitus, *Stroke*, Level Cancer, Bile Cancer, Bronchial and Lung Cancer, Breast Cancer, and Cervix Cancer. From the abovementioned cancers, lung cancer was detected to increase significantly from 1 case in 2016 to 5 cases in 2017. The government of Karanganyar through the Department of Health should set up a program to solve the problem. It is identified that smoking habit is closely related with the presence of lung cancer. It is therefore necessary to educate the

people to change the habit of smoking either as an active or passive smoker.(Luo *et al.*, 2019)

The lung cancer is caused by direct effect of smoking. However, people who do not smoke may also be affected if they get together with smokers (Lin *et al.*, 2017). It is called as passive smoker, asbestos radiation, and heavy air pollution. This disease is sometimes unidentified by person suffering from it. This is due to the symptom of the disease up to some level may not be detected (Cufari *et al.*, 2017). This mainly happens in rural area where people living in it have limited knowledge and awareness to have their condition medically checked and followed by some preventions (Dela Cruz *et al.*, 2011). On the other hand, the lifestyle and living habit of people living in rural area may lead to the risk of suffering from lung cancer. The significant increase of prevalence number of lung cancer indicates how the factor of limited knowledge implying bad living habit strongly related to the high possibility of people suffering from the disease. It is therefore necessary to deliver some knowledge about lung cancer for the people living in rural area to enhance their understanding about the disease. It is expected that by having sufficient understanding about lung cancer, they will change their habit and living style becoming healthier and it therefore minimizes the case of the disease (Weiderpass, 2010).

The lung cancer was often identified on people aged 55 years or older, but it is also currently identified for younger people. The live probability of a person with lung cancer is usually small because the disease is not detected at the beginning stages. At these stages, lung cancer does not give sensible symptoms. However, for the time being, the symptoms start to appear like: worsening cough that is never recovered, breathing difficulty, constant chest sickness, cough with blood, frequent lung infection, felling tired for long time, and losing the weight without clear reason. People with lung cancer are usually detected after stage 3 or 4, meaning this is closing to the final stage of the disease. Cancer at the last stage normally spreads over other organs. If the disease may be identified at the beginning stage, 40 – 50% of the patient may sustain their life for about 5 years. However, if the disease is late detected the number reduces to 1-5% only.

On the other hand, late detected cancer has no possibility for operation (surgery) (Polanski *et al.*, 2016).

Treatment for lung cancer may be carried out by combination of surgery, chemotherapy, radiation, or some innovative methods (Polanski *et al.*, 2016). However, it should be noted that biological behavior (characteristic) of cancer varies for different person. Lung cancer tends to be aggressive. If the cancer is late detected and it already attains stage 4, then it about has no possibility to recover. Patient having no treatment can normally alive for about 4 – 5 months. For the case where the cancer spreads extensively, it can cause the death in couple of days. However, if the cancer slowly spreads, the patient can still alive longer. For the cancer already spreading over the body, the novel method for surgery may not help the patient (Giaj Levra *et al.*, 2020).

Based on the aforementioned description, it may be advised that prevention of the cancer is much better than healing the disease. It is therefore recommended to have regular checkup for the purpose, if there is cancer, then it may be detected earlier for early treatment. Prevention of cancer may be afforded with a healthy lifestyle, consuming a balanced nutritious, physical exercise, not smoking, wearing mask in pollution condition, avoiding fog from motorcycle, industrial process, and burning garbage. Having cigarette is a very dangerous for people with lung cancer as well as consuming alcoholic beverage. Another reason to avoid is not living under the house with asbestos roof, since it may radiate some toxic particles that may lead the person to suffer from lung cancer{Citation}.

The Ministry of Health-Republic of Indonesia introduces the program called “*cerdik*” (smart) that suggests some gudances to prevent cancer. These include: (a) regular medical check-up, (b) consultation with doctor, (c) get away from cigarette, (d) intensify physical activity, (e) having healthy diet, (f) Consuming more fruit, vegetable and protein, (g) having enough rest, and (h), managing stress (Luo *et al.*, 2019).

According to the abovementioned descriptions, the Authors set-up the program of community service for the people of Selokaton. Selokaton is the region at the level of village, under the sub-district of Gondangrejo, the regency of

Karanganyar. Based on discussion with the local government of Selokaton and from observation, it was identified some lifestyle closely related with the occurrence of lung cancer disease. It may be informed that some people of Selokaton have the habit of smoking. They assume that smoking will not really cause lung cancer. Majority of man at a family are smoker. If they have some children, this makes the children to be passive smokers. Passive smoker is even more dangerous than the smoker itself. Therefore, it was often found some children suffering from bronchopneumonia, such kind of disease related with acute infection of respiratory organ. Furthermore, the location of Selokaton is about dry and dusty. This worsens the situation causing respiratory related diseases. The economic condition of Selokaton people is not really bad, since they have some job although some of them do not have permanent employment. The population density of Selokaton is about high and this makes the environmental not sufficiently good. The education level of the people is about moderate, but they seem not easy to accept any new opinion.

The objective of this program is to enhance the knowledge of Selokaton people therefore encouraging them to prevent from the cancer disease. It should be noted from the previous explanations that lack of knowledge and awareness will increase the occurrence of cancer. Their bad habit may not be directly refused but better knowledge about lung cancer will motivate them to avoid any reason leading to suffer from the disease. This program is also aimed to promote healthy lifestyle for the purpose preventing degenerative diseases. Some type of degenerative diseases may be avoided by changing the lifestyle to be healthier (Putra *et al.*, 2015). Some tips to life healthier therefore preventing degenerative diseases was also presented. The program includes presentation followed by consultation on prevention for lung cancer and treatment of the disease.

2. METHOD

The method of community service program includes some activities shown in Fig. 1. and is described sequentially by the following sections. The first step of this program is activity planning

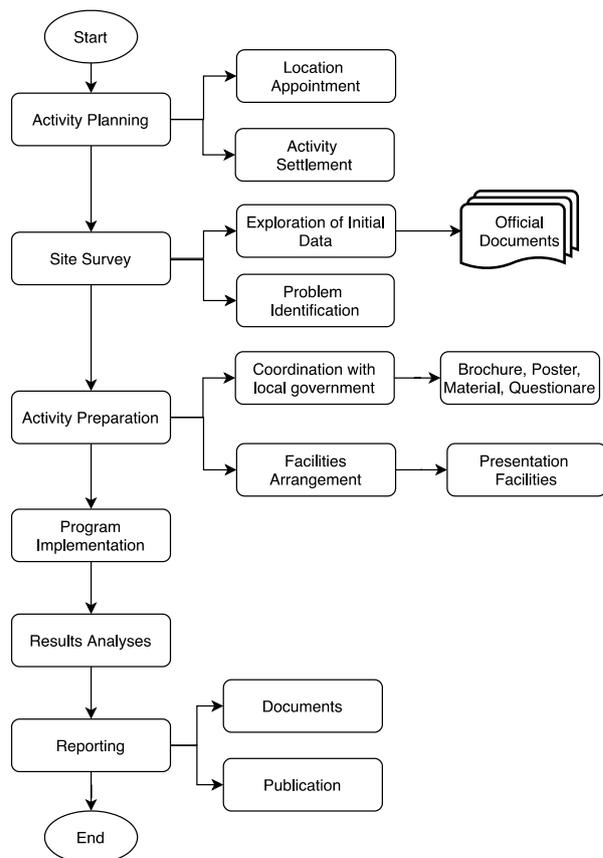


Figure 1. Flowchart of community service program activity

that includes location appointment and activity settlement. The appointed location of this community service is the village of Selokaton. The location was selected based on some initial surveys regarding the need of implementing the program. The real data about prevalence number of lung cancer was not yet be completely obtained from the city of Karanganyar, but this location was determined for the purpose of exploring the people habit that may cause the disease. The available time and financial support do not allow to carry out a complete investigation on the disease. The location at Selokaton was expected to describe the small-scale situation that may present a picture about lung cancer at Karanganyar.

With the location in hand, some activities might be designed for successful program implementation. It was planned to carry out activities for community service program at Selokaton. The activity design should consider some aspects including: (1) assessment of people understanding about the disease, (2) knowledge

enhancement on lung cancer, (3) encouragement for avoiding or recovering the disease, and (4) final evaluation on people knowledge after following the program.

Another site visit was carried out following the activity of program design. This visit is intended to get more comprehensive and detail situation about Selokaton and the people living in it. It was fortunate that the local government of Selokaton provided some necessary data and information. The data talk about population and some demography while the given information describes about the habit and people lifestyle. From the data and information, the material for presentation might be prepared accordingly. Some questionnaire could also be developed based on the existing situation and the expected results of knowledge improvement. It may also be informed that the visit was also aimed to discuss with the local government regarding some practical preparations for the meeting. These include the invitation, room preparation, equipment for presentation, and catering.

The next step was preparation of activity. This includes coordination with the local government regarding some practical aspects for community service activity programs. Some materials were prepared for implementing the program including brochures, poster, questionnaire, and ppt presentation. Facilities for presentation were also prepared, including laptop, LCD data projector, projector screen, sound system, and some cables.

For implementing the program on the day of meeting, some activities were performed, including presentation, discussion, medical consultation, and assessment. These activities are discussed in the following sections.

a. Presentation

This method is used to deliver knowledge and concept about lung cancer, the factors that influence the occurrence of the disease and how to overcome. For the purpose of measuring the knowledge improvement of participants, they must proceed *pre-post test* about the Lung cancer disease before and after presentation.

b. Discussion and consultation

The method was used to facilitate the participants to frankly ask questions if

there is something that they still do not understand from the given presentation. They could also discuss more deeply about the disease. The situation was designed to be semi-formal that makes them freely discuss about what they know about the disease and what they want to know more about it. Private consultation was also provided if there is something that they want to talk personally about the disease. It was provided to anticipate the need of participant for talking more personally about the disease that they may suffer from.

c. Documentation and analysis

The cases found in the activity of presentation, discussion, and consultation were recorded for analysis purpose. The results of analysis will be used to provide recommendations for prevention of the disease and the suggested recovery process for the community. For some cases, there might be necessary to suggest some person to go to the hospital for further medication. The analysis results were also used for reporting and scientific publication.

3. RESULTS AND DISCUSSION

The program of community service for the people of Selokaton, Gondangrejo, Karanganyar was carried out at October 3, 2019. The venue is at the meeting room of the government of Selokaton. From the previous meeting with the government of Selokaton, it was selected 50 people to be invited as participant of the program. However, only 36 people came to the program. The main reason why the people did not attend the program is because they should work. The situation when the program was carried out is shown at Fig. 2.

At the day of program implementation, when the participants came to the venue of presentation, the activity then started. It started with pre-test to assess the knowledge of participants on the disease of lung cancer. Presentation was the next activity to do after the participants took some time for refreshment. The presentation delivers a comprehensive information about lung cancer, but it was presented using dialect that participants might easily understand. Some leaflet and poster



Figure 2. the presentation session at the community service program

containing the information regarding lung cancer were also distributed among of the participants to assist them understanding the topic. Additional information on how to prevent the disease and the medical treatment for the disease were also presented.

After presentation, the participant should again proceed the post-test to measure their improvement of knowledge about lung cancer after receiving presentation. Discussion and consultation were provided after those activities and it seemed that the participants were enthusiastic.

The data found from the program of community service were recorded for analyses purpose. The results of analyses are used for report composition. Besides, the data and the related analyses results are used for publication as well.

Results

Based on the results of community service program, the result of pre-test and post-test are shown in Table 1. It may be observed from the table that the knowledge of participants improves significantly. In one hand, it indicates that the delivery of presentation material enables them to understand better about the disease, and in the other hand, the participants paid sufficient attention on the presentation. This is because they are aware that they need to understand about the disease. This awareness will encourage them to prevent from the disease by avoiding any deed that may lead to suffer from the disease. For those already suffering from the disease, the knowledge will support them in treating themselves in order not to make the condition worse.

Discussion

Degenerative disease is the medical condition of people where organ or tissue is progressing into lower condition due to aging. Based on the WHO data, degenerative disease accounts for 63% of death in worldwide, and causes 36 million people losing their live annually. In Indonesia, the prevalence number of degenerative diseases increases persistently. The Lung Cancer is one of the generative diseases where people are encouraged to be aware about it. This would be the important effort to avoid the disease since the lifestyle of people may lead them to suffer from the disease (Jeon *et al.*, 2018). For this reason, this community service program was designed and implemented. The program aims to deliver knowledge about lung cancer to the participant therefore willing to improve their lifestyle to be healthier. This will be an effective way to protect them from the disease.

However, at the day of program implementation, some participants said that to stop smoking is really difficult. There are reasons why they stated this: they already enjoy smoking therefore very difficult to quit. Another reason is they know that some smoking people even have long lifetime. This reason is *basically* based on no theory or empirical facts and simply relied on

Table 1. The Participants and the Result of Pre- and Post-Test

Age	Number of Participant	Score Improvement	
		Number	Percent (%)
31 - 40	11	37,27	81,8
41 - 50	16	41,88	102,5
51 - 60	6	41,67	113,9
61 - 70	3	30	62,7

what they prefer. However, based on theory and empirical facts, smoking is closely related with the case of lung cancer, and therefore some efforts should be taken to make them stop smoking (WHO, 2019b). In this community service program, some persuasive approaches were done to change their mind that smoking is dangerous and strongly leads them to suffer from some diseases including lung cancer. Some poster and figures were presented how lung cancer is caused mostly by smoking. Some figures were also displayed demonstrating how bad lung cancer and how smoking may strongly cause lung cancer. A brochure was also distributed to make them aware the effect of smoking on the probability to have lung cancer. It may need some time to change the behavior, but it should start to change their mind about the effects of smoking. The brochure will tell them about it, and it is expected to encourage them having healthier lifestyle (Malhotra *et al.*, 2016).

After presentation and discussion, the participants must again proceed post-test to assess their knowledge and the improvement of their understanding on lung cancer. From the post-test it was obtained that the average of mark is 8.53, which indicates a significant improvement from the pre-test with average of mark of 4.58. This enhancement is expected to imply increasing awareness of people preventing themselves from lung cancer. It may lead to healthier lifestyle and stay away from any reason causing lung cancer. It is also expected that the participants are happy to convey the knowledge to the community where they are living in to have better behavior such that all people are aware about the disease and together having better habit. This enables them to prevent the disease (Rahal *et al.*, 2017).

In term of age, the majority participants are in the age of 41 – 50 year. The gender of participant is about the same, yet the number of female participants is more than male participant with the number of 20 (56%) and 16 (44%), respectively. The highest percentage of participant occupation is housewife with the number of 17 (47%). The proportion of participant in terms of age and occupation is indicated in Fig. 3. It could be observed from the figure that the majority participants are in the age of 41 - 50 year old. This may indicate the need of understanding about lung cancer of the people at this age. Conversely, the least people coming to the program were they are in the age of 61 - 70 year old. It was probably due to the topic of program is not of their interest or they may not really understand about the topic. However, they put sufficient attention to the presentation and other activities. It may also be informed that during the activities including pre-test, presentation, discussion, post-test, and consultation, all participants were still in place, no participant leaving the venue until the activity ended.

During the program implementation, the knowledge enhancement of participants was assessed. The improvement is measured with the increase of mark from pre-test and post-test. They were given the same test and their mark achievement was again evaluated. The increase of score and its percentage before and after getting presentation were measured. The mark increase for the different age segments is presented at Fig. 4. It may be observed that all participants had demonstrated their knowledge improvement. It means that they are interested in the topic of presentation and discussion.

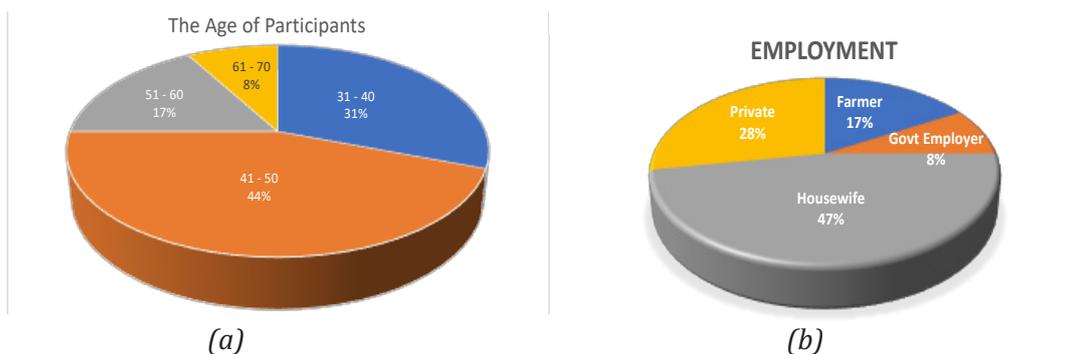


Figure 3. The proportion of participant in terms of (a) Age, and (b) Employment

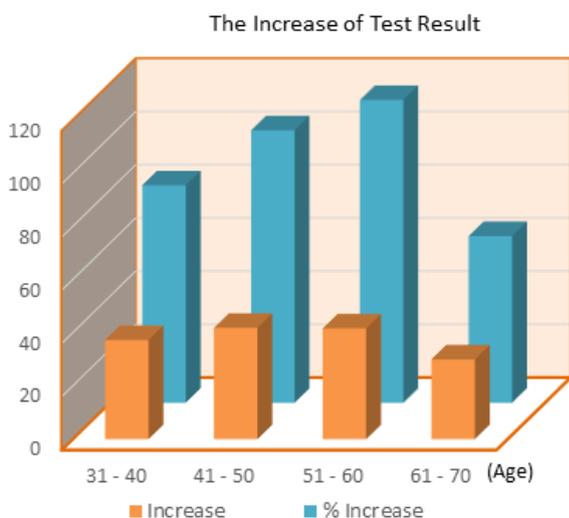


Fig. 4 The increase of test result for pre- and post-test

On the other hand, they feel that the topic is useful, and they need to understand about lung cancer. From the meeting, it was observed that they were enthusiastic joining the meeting and paid full attention for the presentation and discussion.

It may be further observed from Figure 4, that numerically the increase of attendee's understanding about the topic of lung cancer significantly increases. The result of pre-test is considerably low, which is 4.58, and this increases into 8.53 for post-test. The figure indicates that for some age segments, this increment is even more than 100%. In the scale of 100, the average of the increment score is 39.44 (93.98%). Moreover, the highest knowledge is achieved by participant with the age of 51 – 60 year. This confirms that these participants paid enough attention indicating that they need the information about lung cancer. The figure also confirms that the lowest knowledge improvement is at the people with ages of 61 – 70 year. This may be due to their ability to absorb new knowledge become limited and, as a result, for whatever material, the knowledge improvement will be less. Another participant segment with the second lowest understanding improvement is those with the age range of 31 – 40. This is probably because they do not really need to deeply understand about lung cancer. They feel that everything should be alright and

do not need to worry about the disease. For the segment of participant aging 41 – 50 year, the result indicates a significant improvement yet lower than that of the participant segment of 51 – 60 year old. This confirms that they start to aware about lung cancer since this may appear due to some bad habit. Changing lifestyle is therefore necessary and getting knowledge about the disease is crucial for changing (Weiderpass, 2010).

Preventing from the disease is another concern in this community service program. Starting with knowledge enhancement, the participants are encouraged to have better habit to avoid the cancer. Medical consultation was carried out after post-test. The participants were given time to discuss with the doctor about the disease, if they need to talk personally about lung cancer to make sure they are safe from it. It was noted that some people are smoker, where this is the most difficult habit to change. However, they need to gradually leave the cigarette for their health. Some further discussion is therefore necessary to more clearly explore the relation between smoking and the possibility of suffering from lung cancer.

It should be noted that smoking is the major reason of having lung cancer, and therefore some serious efforts should be made for the people to leave smoking. Moreover, the effect of smoking is not only for smoker, but also for the people around. This is called as passive smoker who are people not smoking but take the smoke of burned cigarette (tobacco). The passive smoker may even have more dangerous effects. Therefore, if one of family member is smoker then its effect will be extensive for the whole family. This should motivate a family to have none of them is smoker (Haaf, 2015).

It was listed that more participants are female. It is quite interesting since their motivation is to have knowledge about the disease and to avoid any reason that may cause suffering from it. They complain since some of their husband are smoker. From the presentation and discussion, they will have knowledge that they can encourage their husband to stop smoking. Every family member should be cooperative for together avoiding the lung cancer by staying away from any smoking activity.

Besides, the cause from smoking, the disease may also be caused by air pollution from industry and transportation. For this reason, people working in an industry or living around the industrial site that may have high risk of high air pollution should protect themselves. It may be done by wearing face mask to cover their respiration organ from any dangerous substances getting in their lung and potentially causing the cancer. Similarly, for people travelling with bicycle, motorcycle, or other opened transportation system should also wear face mask. This is due to the air pollution in the road is also intensive in Indonesia.

It may also be found that some houses are covered with asbestos roof. The people living in this house may have higher risk to have lung cancer. This since the asbestos material may radiate some toxic when it is heated by sunlight. It is actually uncomfortable to life in this house yet there is about no choice for the people with limited financial ability. The helpful thing to do is by shielding the people with another material that blocks the radiation such that it may not reach the people living under the roof. Installing this plafond will also make living in the house more convenience.

There some additional attempts to avoid lung cancer. These are not specifically for lung cancer, but for cancer prevention in general. These include: (a) regular medical check-up, (b) consultation with doctor, (c) get away from cigarette, (d) intensify physical activity, (e) having healthy diet, (f) Consuming more fruit, vegetable and protein, (g) having enough rest, and (h) managing stress. These efforts were delivered to the participants to encourage them having better quality of life. The medical test was not done to diagnose if some participants are suffering from lung cancer. This was not covered by the program fund. However, either they have the problem or not, getting knowledge about the disease is important to avoid the disease.

4. CONCLUSION

The program of community service was carried out for the people of Selokaton, Gondangrejo, the Regency of Karanganyar. The number of people getting involved in this program was 36. This community service program included activity of pre-test, presentation and discussion, post-test, and medical consultation. The participants were required to take pre-test and post-test, and their knowledge improvement was measured. It was observed that the knowledge of participants increases significantly indicating that they are interested in the topic of presentation. This also indicates that they need the knowledge for preventing themselves from lung cancer. Medical consultation was provided to identify if they get any sign indicating the existence of lung cancer. Therefore, an early treatment may be taken. The program is also strategic to encourage the people having healthier lifestyle. Smoking is the major cause of lung cancer, which they are difficult to stay away from. A mutual effort is necessary to gradually suppress the number of smoker as well as avoiding its negative effects. Some other air pollutions need to also be avoided, including those from industry and transportation activity. Affording healthier lifestyle is another way to prevent people from cancer including lung cancer. Finally, the local government is encouraged to take the role of motivating people to have health lifestyle, staying away from any reason potentially causing lung cancer, and together with medical staffs doing necessary action to prevent the disease.

5. ACKNOWLEDGEMENT

The Authors would like to thank to the School of Medical Science (STIKes) Kusuma Husada Surakarta that has supported this program.

REFERENCE

- Abdel-Daim, M. M., El-Tawil, O. S., Bungau, S. G., & Atanasov, A. G. (2019). Applications of Antioxidants in Metabolic Disorders and Degenerative Diseases: Mechanistic Approach. *Oxidative Medicine and Cellular Longevity*, 2019, 1–3. <https://doi.org/10.1155/2019/4179676>

- Ananda, R. R., Ermayanti, S., & Abdiana, A. (2018). Hubungan Staging Kanker Paru dengan Skala Nyeri pada Pasien Kanker Paru yang Dirawat di Bagian Paru RSUP DR M Djamil Padang. *Jurnal Kesehatan Andalas*, 7(3), 430–435. <https://doi.org/10.25077/jka.v7i3.898>
- Cufari, M. E., Proli, C., De Sousa, P., Raubenheimer, H., Al Sahaf, M., Chavan, H., Shedden, L., Niwaz, Z., Leung, M., Nicholson, A. G., Anikin, V., Beddow, E., McGonigle, N., Dusmet, M. E., Jordan, S., Ladas, G., & Lim, E. (2017). Increasing Frequency of Non-Smoking Lung Cancer: Presentation of Patients with Early Disease to A Tertiary Institution in The UK. *European Journal of Cancer (Oxford, England: 1990)*, 84, 55–59. <https://doi.org/10.1016/j.ejca.2017.06.031>
- Dela Cruz, C. S., Tanoue, L. T., & Matthay, R. A. (2011). Lung Cancer: Epidemiology, Etiology, and Prevention. *Clinics in Chest Medicine*, 32(4). <https://doi.org/10.1016/j.ccm.2011.09.001>
- Giaj Levrá, M., Cotté, F.-E., Corre, R., Calvet, C., Gaudin, A.-F., Penrod, J. R., Grumberg, V., Jouaneton, B., Jolivel, R., Assié, J.-B., & Chouaïd, C. (2020). Immunotherapy Rechallenge after Nivolumab Treatment in Advanced Non-Small Cell Lung Cancer in The Real-World Setting: A National Data Base Analysis. *Lung Cancer*, 140, 99–106. <https://doi.org/10.1016/j.lungcan.2019.12.017>
- Haaf, K. ten. (2015, September). *Should Never-Smokers at Increased Risk for Lung Cancer Be Screened? / Request PDF*. https://www.researchgate.net/publication/281137606_Should_Never-Smokers_at_Increased_Risk_for_Lung_Cancer_Be_Screened
- Jeon, J., Holford, T. R., Levy, D. T., Feuer, E. J., Cao, P., Tam, J., Clarke, L., Clarke, J., Kong, C. Y., & Meza, R. (2018). Smoking and Lung Cancer Mortality in the United States From 2015 to 2065. *Annals of Internal Medicine*, 169(10), 684–693. <https://doi.org/10.7326/M18-1250>
- Kementerian Kesehatan. (2019). *Profil Kesehatan Indonesia 2018 [Indonesia Health Profile 2018]* (p. 207). http://www.depkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Data-dan-Informasi_Profil-Kesehatan-Indonesia-2018.pdf
- Lin, K.-F., Wu, H.-F., Huang, W.-C., Tang, P.-L., Wu, M.-T., & Wu, F.-Z. (2017). Propensity Score Analysis of Lung Cancer Risk in A Population with High Prevalence of Non-Smoking Related Lung Cancer. *BMC Pulmonary Medicine*, 17(1), 120. <https://doi.org/10.1186/s12890-017-0465-8>
- Luo, Q., Steinberg, J., O'Connell, D. L., Yu, X. Q., Caruana, M., Wade, S., Pesola, F., Grogan, P. B., Dessaix, A., Freeman, B., Dunlop, S., Sasieni, P., Blakely, T., Banks, E., & Canfell, K. (2019). Lung Cancer Mortality in Australia in The Twenty-First Century: How Many Lives Can be Saved with Effective Tobacco Control? *Lung Cancer*, 130, 208–215. <https://doi.org/10.1016/j.lungcan.2019.02.028>
- Malhotra, J., Malvezzi, M., Negri, E., La Vecchia, C., & Boffetta, P. (2016). Risk Factors for Lung Cancer Worldwide. *The European Respiratory Journal*, 48(3), 889–902. <https://doi.org/10.1183/13993003.00359-2016>
- Polanski, J., Jankowska-Polanska, B., Rosinczuk, J., Chabowski, M., & Szymanska-Chabowska, A. (2016). Quality of Life of Patients with Lung Cancer. *OncoTargets and Therapy*, 9, 1023–1028. <https://doi.org/10.2147/OTT.S100685>
- Putra, A. C., Nurwidya, F., Andarini, S., Zaini, J., Syahrudin, E., Hudoyo, A., & Jusuf, A. (2015). *Masalah Kanker Paru pada Lanjut Usia*. 42(11), 5.
- Rahal, Z., El Nemr, S., Sinjab, A., Chami, H., Tfayli, A., & Kadara, H. (2017). Smoking and Lung Cancer: A Geo-Regional Perspective. *Frontiers in Oncology*, 7. <https://doi.org/10.3389/fonc.2017.00194>
- Travis, W. D., Brambilla, E., Nicholson, A. G., Yatabe, Y., Austin, J. H. M., Beasley, M. B., Chirieac, Lucian. R., Dacic, S., Duhig, E., Flieder, D. B., Geisinger, K., Hirsch, F. R., Ishikawa, Y., Kerr, K. M., Noguchi, M., Pelosi, G., Powell, C. A., Tsao, M. S., & Wistuba, I. (2015). The 2015 World Health Organization Classification of Lung Tumors. *Journal of Thoracic Oncology*, 10(9), 1243–1260. <https://doi.org/10.1097/JTO.0000000000000630>

- Weiderpass, E. (2010). Lifestyle and Cancer Risk. *Journal of Preventive Medicine and Public Health*, 43(6), 459. <https://doi.org/10.3961/jpmph.2010.43.6.459>
- WHO. (2019a). *Cancer*. <https://www.who.int/westernpacific/health-topics/cancer>
- WHO, 2019. (2019b, May 29). *WHO Highlights Huge Scale of Tobacco-Related Lung Disease Deaths*. <https://www.who.int/news-room/detail/29-05-2019-who-highlights-huge-scale-of-tobacco-related-lung-disease-deaths>