Empowering adolescents as peer-educators for early prevention of non-communicable diseases: Through existing ‘POSBINDU’ program in Indonesia

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Abstract

Background: Human lifestyles, including sedentary activities, obesity, and smoking, are associated with a high risk of non-communicable diseases that are a leading cause of death globally. Accordingly, health promotion should be done as early as possible in the adolescent period. Aims: This study explores the efficacy of a peer-educator program in promoting the healthy habits of adolescents, via an existing Indonesian community initiative program called ‘POSBINDU’ (Integrated Counseling Post), led by the general practitioners. Methods: Twenty-week ‘experiential learning’ approach with mixed-method was designed to: 1) Train 10 GP trainers, 2) Recruit and observe the 10 group-1 and 50 group-2 peer-educators in a high school; 3) Develop modules on health lifestyles by the GPS and peer-educators, and 4) Implement the POSBINDU program at the high school. Results: Both GPs and students’ perceptions significantly increased before to after the intervention (p > 0.05). The participants also expressed they experienced increased comprehension of NCDs and the importance of healthy habits. Conclusions: The existing POSBINDU community's initiative program can potentially be improved by appropriate interventions to empower school students towards better healthy habits to prevent the early progression of NCDs.

Keywords: Adolescent, empowerment, experiential learning, health promotion/education, non-communicable diseases

Introduction

Empowering young adults to be peer educators for health lifestyle is the key to prevent early complication of non-communicable diseases.¹ Adolescence is an important period within the human life cycle in which healthy-unhealthy habits will significantly contribute to the health in adult life.² In addition to the unhealthy habits problems in adolescent, non-communicable diseases (NCDs) have been global issues and one of the main targets of the sustainable development goals.³ The lifestyle habits associated with NCDs are developed during the adolescent period and usually neglected by the health professionals and the society.¹ Malnutrition, including obesity, is often a lifelong problem, along...
with smoking habits and a sedentary lifestyle, besides many other issues in adolescents’ periods, i.e., reproductive health, mental health, injury and abuse, and other illnesses. However, NCDs are preventable mainly if health interventions are provided as early as possible, especially in the adolescent period.

Indonesia is the largest archipelago country and the fourth most populous country in the world. This complexity influences the country’s health status. The government faces demographical transitions in which life expectancy has steadily increased and is also accompanied by changes in people’s lifestyles and health behavior lead to increased number of NCDs. Overall, tobacco use in Indonesia has increased from 1990 to 2016, especially smoking among adolescents aged 16-19 years. Adding to the comorbid NCDs problems, Indonesia’s population suffers from hypertension, and type two diabetes mellitus. Not surprisingly, NCDs are the leading cause of death, where most mortalities are due to ischemic heart disease, cerebrovascular diseases, and diabetes. The country is forced to prepare for the ‘triple burden’ of health problems (NCDs, infectious diseases, and injuries).

Current countermeasures to prevent NCD are still inadequate, mainly because of the lack of a comprehensive and sustainable health promotion approach about unhealthy lifestyles and insufficient and insufficient screening by health professionals. Over the past decade Indonesia is more focused on preventing NCDs but in the elderly population, targeted by the national health insurance agency, than meeting the opportunities provided by focusing attention on adolescents. The onset of unhealthy lifestyle patterns starts with exposures to fast food and beverage advertisements, and early-developed smoking habits in adolescents. Therefore, there is a significant gap in the provision of health services for Indonesian adolescents.

This project implemented an ‘experiential learning’ approach in which key stakeholders (GPs, medical students, and adolescents) were involved in the development of an educational initiative program and related modules for early prevention of NCDs in adolescents. ‘Experiential learning’ is a well-known method in education to enhance the acceptability and applicability of the learning process. It emphasizes active learning, based on reflections of actual experiences and cultural contexts and planning further actions to serve the community education goals. Building relationships properly with adolescents should also be mastered by the GPs.

Furthermore, the educational programs are embedded into existing and well-known community and school working groups on adolescent health, called POSBINDU (Integrated Counseling Posts), to continuously screen productive ages for primary and secondary prevention, which are nurtured by the Ministry of Health Rep. Indonesia/MoH-RI and implemented by local primary care centers health professionals (Puskesmas). The method of this community initiative post are the concepts of 5-DESK, as shown in Figure 1. The local community may run this post routinely, without awareness on the NCDs problems.

Preparation of logistics and facilities:
Initiated by groups of community, about 30-50 participants per POSBINDU activity. They prepared healthy snacks, beverages, and the 5 DESKs with its facilities.
Content:
Nurtured by health professionals at local Community Health Centre/ Puskesmas.
Reporting:
Individual report goes to individual, and group report goes to website of Ministry of Health Republic Indonesia by the Puskesmas.

Figure 1: POSBINDU FORMATS by Ministry of Health Republic of Indonesia (MoH-RI)

Therefore, in this study we investigated the efficacy of the peer-educators program in promoting the healthy habits of adolescents to prevent future NCDs, via the existing Indonesian community initiative of POSBINDU (Integrated Counseling Post) led by general practitioners (GPs).

Methods
Kolb’s experiential learning methods were applied to the educational development of this study. Figure 2 illustrated the model and explained the sequential research procedures. This study used a mixed-method approach with pre- and post-test and strengthened by focus group discussions.

The study population was 10 GPs and 60 vocational high school students of Gunung Kidul District, Special Province of Yogyakarta (N group-1 peer educators = 10, N group-2 peer educators = 50). Collaboration by the District Education Office (DEO) and the local District Health Office (DHO) appointed this school, for this study: Ten medical students voluntarily assisted the GPs in developing modules in this experiential learning process.

The ‘concrete experiences’ phase
We started with a one-day training for GPs on building relationships with adolescents. Questionnaires to evaluate the ‘concrete experience’ phase involved administering the PARTY (primary care prevention, access, and risk-taking in young adults’ project) questionnaires. The training was followed with an actual survey at one of the vocational high school at Gunung Kidul. The GPs and medical students were paired during the survey and observations, which included asking 30 school students’ outside the participants in this study, to complete a Google-survey form concerning daily habits of physical activities, food consumption, and smoking habits.

The ‘reflective observation’ phase
In the next learning cycle we presented the surveys’ results, and
we guided the GPs in reflecting on previous experiences (the PARTY training and the survey). We discussed what went well, why, and what they observed about the NCDs problem in adolescents and lessons learned. After the reflection, we immediately trained the GPs and the medical students to engage the school students to be peer educators. We did the training with various ‘active and exciting/ fun’ learning methods such as simulation, small group discussions, and cooperative learning activities. These experiences helped the GPs in developing the educational modules in preventing NCDs and coaching the school students with the modules.

The ‘abstract conceptualization’ phase

The GPs, together with the medical students and group-1 of the school students (10 peer educators), developed learning modules for high-school students regarding the prevention of NCDs. We divided the participants into small groups and allowed adequate time (6 weeks) to formulate the modules of NCDs prevention suited to the adolescents’ interests. We also facilitated the delivery of the modules into printing. In one group, one GP assisted by one medical student and one peer educator. The five small groups worked on each of the following five constructs: 1. POSBINDU related matters, 2. Peer educator skills, 3. Healthy food diet, 4. Non-smoking habits, and 5. Physical activities. These topics are the five constructs of the evaluation questionnaires we developed and used for evaluation later in this study.

The final ‘active experimentation’ phase

The last cycle was ‘active experimentation,’ which implemented the modules into the existing community initiative program or POSBINDU. The GPs and medical students coached the group-1 peer-educators of high school students about POSBINDU and the modules of prevention of non-communicable diseases. Coaching was done intensively every two weeks and coordinated by a team of coordinators.

Through this training, these group-1 peer educators were prepared to educate the group-2 of 50 peer educators. Prior to a POSBINDU program, one peer-educator in group-1 had a task to educate the other five students of group-2 in persons. Ultimately, a POSBINDU program was successfully conducted by the group-1 students to the group-2 students, based on the MoH-RI guidelines, but reorganized with the modules of preventing NCDs they had developed.

Questionnaires to assess the ‘active experimentation’ phase were constructed based on the five constructs in the NCDs module developed by the study participants as described above. The guideline questions for the focus group to evaluate the ‘active experimentation’ phase were: 1. What do you think was beneficial? 2. How is your engagement with adolescents after the training? And 3. What is your plan? At the end of the ‘active experimentation’ phase, each of the 60 students (both groups) was given a log-book, which was also constructed based on the same five topics of constructs. Using this material as a guide, the students did a self-evaluation based on their log-book.

**Results**

‘Concrete experiment’ phase (Training the GPs)

The PARTY questionnaires and scores from between pre- and post-training using paired sample t tests for statistical analysis
showed that there were significant differences ($p < 0.05$) in GPs’ perceptions in providing health promotions for adolescents and comprehension of NCDs, as shown in Table 1.

| Gender | Pre test | Post test | *P* significant if <0.05 |
|--------|----------|-----------|-------------------------|
|        | n | Mean | Standard deviation | n | Mean | Standard deviation |                    |
| Female | 8 | 324.38 | 122 | 8 | 441.13 | 34 | 0.007* |
| Male   | 4 | 400.75 | 47  | 4 | 439.75 | 7  |         |
| Total  | 12 | 349.83 | 108 | 12 | 440.67 | 28 |         |

‘Reflective observation’ phase (Reflection on the Training)

Results of the small survey (unpublished and only to help reflective process) and observations on daily dietary intake, daily activities, and smoking habits in elementary school and high school students were critical points for reflection. This survey was intended to widen participants’ views regarding adolescents’ actual habits, which may contribute to later NCDs and to refresh their memory with both the fun and challenging sides in approaching adolescents.

‘Abstract conceptualization’ phase (Module Development)

A module in preventing NCDs, designed explicitly for high school-age students was completed. The module is a 50-page booklet with many interesting photos made by the medical students and high school students.[12] The whole format and five of the module constructs were created to attract the attention of the high school students, inform their knowledge on NCDs prevention, and prepare them to be peer-educators.[8,13‑15]

‘Active experiment’ phase (Peer-educator Training)

One of the significant results of this phase was that the GPs successfully empowered the high school students in this study, the teachers, and the school’s committee. The school, which had initiated the POSBINDU with the NCDs module, successfully made the POSBINDU activity as one of the extracurricular activities. This success means that from each year’s class, there will always be students to join the peer-educator program and who will be trained and conduct POSBINDU activities regularly. Videos of the extracurricular activities in POSBINDU are available on a http://p2ptm.kemkes.go.id/kegiatan-p2ptm/diyogyakarta/genre-telor-emas-di-posbindu-krida-husada-smkn-1-ngawen-kabupaten-gunungkidul. The school also expanded the healthy lifestyle habits into more hands-on activities such as a healthy-canteen and growing organic vegetables and fruits in the school’s back yard.

The questionnaires in this ‘active experimenting’ phase showed that the pretest and posttest scores of students, both group-1 and group-2 students, were significantly improved ($p < 0.05$).

This result indicates that students’ perceptions increased between before and after the intervention using the POSBINDU Module [Table 2]. In each item or sub-topic studied, it turns out that almost all the sub-topics in Table 2 show a significant increase in post-test comparison, except for the ‘peer-educators’ item and ‘benefits.’ These two items, independently, only consist of 2 questions. For the ‘peer-educator’ item, the actual average score showed a reasonably good rise (from an average of 1.5 to an average of 2.8 for both peer groups 1 and 2, but the pre-and comparison’s final results posttest were not statistically significant ($p > 0.05$).

Results of qualitative data in Table 3 show that overall, peer-educators are generally happy because they are welcomed/trusted by peers, and they like to share health promotion information. However, peer-educators’ difficulties include some difficulty in understanding the meaning and intention of the POSBINDU program, while it was aggravating that some peers did not pay close attention. It was especially surprising when we found the discovery of smoking habits in peers since the middle-school period. In suggesting improvements to the program, there were various exciting recommendations, including offering multiple types of counseling to prevent the NCDs from being made with multiple learning resources, such as videos, banners, and psychology counselors, including for better handwashing and physical activity programs.

The qualitative study results using focus group discussions revealed remarkable changes in perspectives of the GPs, medical students, and school students who participated in this study. Table 4 explains how the participants’ views on the primary prevention of NCDs increased remarkably, and how they also would like to share their knowledge with others and supplement their efforts with other innovative plans to snowball awareness. The participants also learned more about the importance of multidiscipline collaboration, about close working relationships and communication, and understanding more about adolescent health, all of which are usually neglected in most medical schools and the traditional practice of medicine.

Additional results revealed a continuity of this project, showing that the POSBINDU program, which is now an extracurricular activity, was replicated by the 50 group-2 students to reach the other 250 targets with another round six months later (one student educating the other five students). Table 5 explains the results of POSBINDU Health Screening at DESK-3 Lab-check. The results were surprising, indicating that almost half of the female peer population turned out to have blood capillary cholesterol numbers that exceed normal, and more than two-thirds of the male peer population regularly are smoking or have already begun to smoke. At Counseling DESK-5, it was found that the high school students mostly consume instant noodles, rarely eat vegetables and fruit, and seldomly do physical activity. Besides the fact that smoking habits are already entrenched in the environment, unfortunately, the habit-forming lifestyle is considered natural. Also, almost one-fifth of the male...
student population has tried drinking alcohol. However, the results reflect that the majority of the study population’s stress levels are likely to be low because of the few insomnia complaints.

**Discussion**

In general, the peer education activities using the POSBINDU youth education module improved perceptions of both GPs and high school students from pre-posttest levels. Their comprehension about the aim of the community initiative of POSBINDU and the importance of prevention of NCDs was meaningfully improved. By educating peers, school students can experience great benefits of being trusted and sharing knowledge. The program was sustained as demonstrated by the school managers who were creatively promoting the program as one of the extracurricular for the students, so the POSBINDU and its modules will run periodically. This sustainability resulted from the GPs in this study who successfully educated the schools’ stakeholders and students and inspired the school’s managers to continue expanding the program in a more meaningful way.

Before this program was conducted through an ‘experiential learning’ approach, neither GPs, medical students, or school students and teachers could completely understand the importance of the 5-Desk POSBINDU, which should let them explore the health risks, do the actual examination, and counsel the participants. The module developed in this study facilitated them to comprehend the existing POSBINDU system better, learn the necessary skills to approach adolescents, and educate others on healthy lifestyle habits to prevent NCDs.

‘Experiential learning’ was demonstrated to be a suitable learning cycle to guide the participants in this study to participate in the research actively and empower them to move the ideas forward creatively. Many health promotion programs have used a variation of the methods to empower the community, such as peer-led training, family-based visits, nurse-led education, and other means.[14-16] The essence of these various methods is to ensure there is plenty of access to information and support for the students to improve their quality of health. As demonstrated in this study, the experiential learning cycle can also be a useful tool to promote primary health prevention among community members.

Smoking habits have been entrenched and deeply rooted in Indonesian people’s lives for centuries, as was also found in this study. One study showed that 70% of young men smoke or tried cigarettes, supporting the survey data listed for the State of Indonesia that 2/3 of men in Indonesia are smokers, and only a few have the desire to stop smoking. Indonesia ranks at

Table 2: The results of pre- & post-test per of sub categories of questionnaires

| Sub categories of questions       | Peer-educators (Group-1)** (n=10) | Peer-educators (Group-2)** (n=43) |
|-----------------------------------|-----------------------------------|-----------------------------------|
|                                   | Pre-test                          | Post-test                         | Pre-test                          | Post-test                         |
|                                   | Min/max Mean SD                   | Min/max Mean SD                   | Min/max Mean SD                   | Min/max Mean SD                   |
| POSBINDU (7 items)                | 1/5 3 0.682                       | 1/5 4.107 0.262 0.010*            | 1/5 2.587 0.701                   | 1/5 3.873 0.176 0.003*            |
| Peer-educators (2 items)          | 1/5 1.875 0.781                   | 2/5 3.812 0.382 0.126            | 1/5 1.555 0.702                   | 1/5 2.833 0.006 0.164            |
| Non-smoking habits (12 items)     | 1/5 4.125 1.125                   | 1/5 4.442 0.631 0.396            | 1/5 4.088 1.176                   | 1/5 4.364 0.954 0.021*           |
| Healthy food diet (5 items)       | 1/5 2.075 0.192                   | 1/5 3.05 0.2 0.008*              | 1/5 2.496 0.081                   | 1/5 2.888 0.029 0.501            |
| Physical activities (5 items)     | 1/5 1.9 0.253                     | 1/5 3.425 0.246 0.001*           | 1/4 1.511 0.134                   | 1/5 2.570 0.075 0.029*           |
| Non-communicable diseases (4 items) | 1/5 2.812 1.088                  | 1/5 3.812 0.463 0.159            | 1/5 1.842 0.817                   | 1/5 3.222 0.428 0.000*           |
| Benefits of the program (2 items) | 4/5 4.312 0.007                   | 1/5 4.375 0 0.422                | 1/5 3.462 0.033                   | 3/5 4.388 0.082 0.048*           |

*P significant if <0.05, **Comparison of all items of pre-post-test Group-1 and 2 students found insignificant (p>0.05).

Table 3: Results of qualitative descriptive study from the peer-educators (Group 1 + Group 2=n=60)

| Categories                          | Fun things                                      | Less Fun                                      | Recommendation for the program |
|-------------------------------------|-------------------------------------------------|-----------------------------------------------|--------------------------------|
| POSBINDU                            | Enthusiasm of peers (n=16)                      | Less focus of peers (n=8)                     | More socialization of the modules, perhaps online (n=11) |
| Peer-educators                      | Fun to share knowledge (n=13)                    | Unclear explanation (n=7)                     | Variation in learning the module (i.e. game) (n=9) |
|                                    | Fun to share knowledge (n=11)                    | Ashamed feelings of peers (n=14)              | I hope to do better next time (n=5) |
| Non-smoking habits                  | Self-confidence (n=11)                          | Lack of experience (n=3)                      | I hope to do better next time (n=11) |
|                                    | Enthusiasm of peers (n=9)                       | Many peers start smoking since early adolescence (n=12) | I learned much about smoking (6) |
|                                    | Fun to share knowledge (n=8)                     | Peers seem to not understand the explanation (n=6) | Vegetables are really important, we can grow organic ones in back of the school yard (n=10) |
| Healthy food diet                   | Enthusiasm of peers (n=16)                      | Dislike vegetables and fruits (25)            | Regular daily physical activities at school (n=8) |
|                                    | Fun to share knowledge (n=9)                     | Some peers do not understand the explanation (n=2) | |
| Physical activities                 | Fun to share knowledge (n=15)                    | Less enthusiasm in learning (n=10)            | |
|                                    |                                                  | Lack of physical activities (n=7)             | |
Since 2012, the Post ‘Active experimentation’ phase has been introduced. 18% of males have tried alcohol, and 70% of males are smokers. This program is highly important to save the MoH-RI. The other effect of this research is the remarkable comprehensions for healthy adult, as the original intention of the program from students but also employees in any offices; as a screening tool POSBINDU should also be expanded not only for schools to make smoke-free efforts.

Smokers with the same or more significant health hazards as active smokers. Considering the consequences of smoking, which are so extensive for adult and elderly health problems, it is urgent to make smoke-free efforts.

POSBINDU should also be expanded not only for schools students but also employees in any offices; as a screening tool for healthy adult, as the original intention of the program from the MoH-RI. The other effect of this research is the remarkable collaboration between universities/researchers, local health centers, and schools as participants to make POSBINDU or youth activities a routine program in the school, with extracurricular specifically for POSBINDU.

This study was not focusing on covering mental-health, reproductive-health, and prevention of injury issues in adolescents, which are other pillars to be addressed for further research in adolescent. Many parties should also campaign for the ‘healthy canteen’ criteria for each school to provide healthy and nutritious food for the students. Consequently, education about healthy snacks also needs to be started as early as possible from the elementary school period. In this case, parents and teachers will need to get an education about an adequate healthy lifestyle.

Physical activity needs to be regularly scheduled among teenagers, wherein this study found that physical activity was felt to be very lacking, especially for young women. Given that several studies have found many problems with anemia among young women, the combination of anemia and hyper cholesterol is unique. Proper development requires adequate nutrition (in this case, iron and multivitamins), with less fat intake. Thus, the distribution of energy through sufficient physical activity (especially aerobic ones) and the improvement of healthy nutrition are very much needed by adolescents to form a healthy generation and avoid catastrophic disorders later in life.  

The top in consuming tobacco in ASEAN countries. Since so many Indonesian men smoke, Indonesian women may also follow their example of poor health habits or become passive smokers with the same or more significant health hazards as active smokers. Considering the consequences of smoking, which are so extensive for adult and elderly health problems, it is urgent to make smoke-free efforts.

| Questions                        | GPs                                      | Medical students                                      | Group-1 students                                      |
|----------------------------------|------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Engagement with adolescents      | Now I understand that as a GPs I can help the adolescents to empower themselves and their peers. This actually enriched my role, rather than only sitting at the clinic and waiting for sick patients to visit me. | I like to communicate with the school students and also I feel they are kind like trust us and also share many ideas. | I was amazed by the doctors who would come to our school. I thought a doctor only works in her/his clinic. |
| Confidence with adolescents      | I never had an idea of what was adolescence-health, although I have three adolescents at my home, my own children. Now, I understand that we can start effective communication with them by ensuring confidentiality and being open for their participation of ideas and actions. Before this program, in scale of 0-10, my score was about 5, afterwards it’s about 8. | We can laugh together and that is the point when I knew our messages had got through. Before this, the program was about 3, and now, I think perhaps 5 because I feel I have to keep on learning and I’m still trying to figure out the role of the GPs at Puskesmas. | I thought the gap of communication between us and the doctors is so huge, we are afraid to talk to them. However, in this project I see that they are very communicative by inviting us during the module development and also POSBINDU program. |
| NCDs comprehensions              | Now, I realize that to prevent the NCDs, we have to work early in the adolescence years, rather than only focus on final complications of i.e., a hypertension, that is what we do now in the current national insurance era. | Wow! I studied medicine and never thought about early prevention of NCDs for adolescents, which was my age, until I joined this program. | I heard about POSBINDU but do not actually know what it is, it was just a boring 5-DESKS rotation, until I joined this program. It is highly important to shape good lifestyle habits early on. |
| Multi-sectors collaborations       | I really like to collaborate across ages, which I found in this project. We communicate with school children, medical students, GPs, parents, teachers and school committee members. Never had such an experience before. | We are usually learning in class. This program allowed us to know and to contribute more to the community health needs. | It is fun to work together with the doctors, the medical students and the teachers to establish this POSBINDU program, the healthy canteen, and growing the organic veggies. |
| Future plans                      | This program is highly important to save the future generation and also saving our national budget. It needs to be sustained, and I will try with schools in my area. | I will keep trying to communicate properly to approach the adolescents and be based on their perspectives. It is difficult when we are exposed to a doctor-centred training. | I will expand the knowledge to my friends and my family about the importance of healthy lifestyle. |

| Table 4: Results of focus group discussions at the final evaluation in this study |

| Questions                        | GPs                                      | Medical students                                      | Group-1 students                                      |
|----------------------------------|------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Engagement with adolescents      | Now I understand that as a GPs I can help the adolescents to empower themselves and their peers. This actually enriched my role, rather than only sitting at the clinic and waiting for sick patients to visit me. | I like to communicate with the school students and also I feel they are kind like trust us and also share many ideas. | I was amazed by the doctors who would come to our school. I thought a doctor only works in her/his clinic. |
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| Table 5: Screening results at POSBINDU Desk-3 simple-capillary laboratory examination by the 50 peer educators to other 200 students at SMK I Ngawen - Gunung Kidul |

| Laboratory examination | Gender | Explanation |
|------------------------|--------|-------------|
|                        | Male (n 177) | Female (n 139) |
| Cholesterol            | 18     | 68          | 48% Female hypercholesterolemia |
| Blood glucose          | 0      | 0           | No symptom found of T1 or T2DM |
| Smoking habits         | 127    | 1           | 70% males are smokers |
| Alcohol use            | 32     | 0           | 18% males tried alcohol |
| Sleep disorder         | 3      | 9           | Minimum sleep disorders |

This study was not focusing on covering mental-health, reproductive-health, and prevention of injury issues in adolescents, which are other pillars to be addressed for further research in adolescent. Many parties should also campaign for the ‘healthy canteen’ criteria for each school to provide healthy and nutritious food for the students. Consequently, education about healthy snacks also needs to be started as early as possible from the elementary school period. In this case, parents and teachers will need to get an education about an adequate healthy lifestyle.
promotion programs are recommended to produce changes in the students’ healthy habits for the short-term or even long-term impact, depending on the program duration.\textsuperscript{[20]}

This study was conducted in a small rural region in Yogyakarta province that may not represent a wider Indonesian geographic population, which is very diverse. However, there may be similar community initiatives in other Asia-Pacific regions. With the particular modules to empower young adults to prevent NCDs, this study could be scaled up to other provinces or other countries with minor adjustments for their cultural context and geographic uniqueness.

Conclusions

We demonstrated the ‘experiential learning’ approach could help the current GPs to empower the adolescents towards the prevention of non-communicable diseases, using the existing community initiative which is familiar with the participants in this study.

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Ethical Clearance

This study had been approved by the Commission of Ethics, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada No.KE/FK/1275/EC/2017. All participants had received explanation prior to participation in this study and had signed the informed consent form.

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Conflicts of interest

There are no conflicts of interest.

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