

Effect of a Pilot Programme by Capability Approach to Prevent Lifestyle-related Diseases in Kaski, Nepal

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Abstract

In the rural area of Nepal, lifestyle-related non-communicable diseases (NCDs) are emerging in recent days. We piloted a program model (2017-2019) to protect people from lifestyle-related diseases in a remote village of Kaski district where the health facilities are limited. This program was supported by Japan International Corporation Agency. We aimed to initiate a simple model of health monitoring to reduce the risks of lifestyle-related diseases. Health monitoring (blood pressure and body weight measurement) together with peer education regarding lifestyle-related disease was conducted by trained volunteers on regular bases. One-group pre-test-post-test research design was used to measure the impact of the program on the 104 participants with the age ranging 52 ± 8.99 years in female and 57 ± 7.38 years in male, sampled from the 100 households in the target village, Gairegaon. The double burden of underweight and overweight was observed in the programming community. After the program was conducted for one year, the percentage of people who is in the normal body mass index (BMI) range was significantly increased from 68.2% to 75.9% in total. Similarly, the ratio of normal blood pressure rose up significantly from 40.4% to 59.6%. This program results suggested that the community-led capability approach works effectively with locally affordable cost to change the behavior of people to reduce the risk of lifestyle-related diseases.

Keywords: blood pressure, BMI, body weight, capability approach, health monitoring, lifestyle-related diseases, peer education

Introduction

In recent years, epidemiological and nutrition transitions resulted in shifts from undernutrition and infectious diseases to overweight/obesity and diet-related NCDs. It is said NCD kills 41 million (79% of global deaths) each year. [WHO, 2018 Non-Communicable Diseases], NCD is

also called the lifestyle-related disease, including cardiovascular disease, cancer and diabetes, etc. Within Nepal, past studies reported prevalence of NCDs; hypertension 22.4 % - 38.6 %, diabetes 4.1 % - 9.5 % and cardiovascular diseases 5.7 % [Mishra, 2015]. We had recognized that even in a rural area in western Nepal, residents are suffering from those NCDs after reviewing the statistical data of local health posts and other research reports [Gauchan, 2018]. According to a statistical report by the government of Nepal, 37% of under 5 children in the mountain region are still underweight [FAO, 2016]. On the other hand, recent studies in Kathmandu revealed that the incidence of obesity and overweight is reported to high in the Nepali adult population [Amatya, 2014]. It is also recognized that the double burden of malnutrition (DBM) has become the new standard in the global level. The DBM is defined as the coexistence of undernutrition along with overweight/obesity or diet-related non-communicable diseases (NCDs), within individuals, households and populations as well as across the life course [WHO, 2016].

Metabolic risk factors contribute to four key metabolic changes that increase the risk of NCDs are raised blood pressure, overweight/obesity, hyperglycemia (high blood glucose levels) and hyperlipidemia (high levels of fat in the blood) [WHO, 2018 Non-Communicable Diseases]. Considering the context of rural Nepal where a blood test cannot be done easily, health monitoring by body weight and blood pressure seemed to be more realistic for the prevention and early detection of lifestyle-related diseases. In rural Nepal, people have to go to the nearest health facilities such as clinics and hospitals to have their body weight and/or blood pressure measured. As our baseline survey result showed, people are not so aware of the risk of lifestyle-related disease. Many of them didn't know their usual body weight and/or blood pressure. Thus, we decided to make a basic model of health monitoring in regard to lifestyle-related disease prevention for rural villages, mobilizing local human resources with a locally affordable budget through community participation. We applied the capability approach and hypothesized that even the people who are illiterate or semi-literate also can change their behavior to reduce the risk of lifestyle-related diseases after their knowledge and skills were gained through the program.

Machhapuchhre RM is located in a hilly region, 16 km away from Pokhara city. Roads are rough, narrow and steep in some places and difficult to access, especially in monsoon. The population of Machhapuchhre RM Ward-6 is 2781 (Male: 1251, Female: 1530), residents in 767 households. The community consists of mixed ethnic groups. Most of the villagers live a self-sufficient life, depending on farming in terraced fields built on steep slopes. They produce crops such as rice, beans, corn, millet, barnyard grasses and wheat. Joint families are decreasing and nuclear families with the absence of fathers due to migration abroad are rapidly increasing. Depopulation and aging is serious issues similar to other remote villages. Local health facility is only one health post with two health personnel (senior auxiliary health worker I, auxiliary nurse midwife I) and limited medicine/equipment.

Methods

Target Community

This program was conducted as pilot activities in the area called Gairegaon that has 100

households in total in Machhapuchhre RM Ward-6 (Former Dhital VDC), in Kaski district, Nepal. The whole village of Gairegaon was chosen as the target community because of the location, its balanced ethnicity structure, the lower socioeconomic status than other areas and the number of households that was suitable to the scale of the program.

Ethical Considerations

This is the project financially supported by the JICA grassroots technical cooperation fund. According to the ethical clarification guideline of Nepal, approvals were obtained from the Machhapuchhre RM office, Kaski District Coordination Committee and the Social Welfare Council, Nepal after the project proposal was authorized from the internal ethical committee of Morinomiya University of Medical Sciences, Osaka Japan. In the surveys, oral and written consent are obtained in advance from the participants.

Program Strategies

The duration of the project was 1 year and 11 months (September 2017 - July 2019). Our main strategy was the health monitoring by regular measurement of body weight and blood pressure by the trained health volunteer team. Local youths were recommended by others or by themselves to become volunteers. The local health post-in-charge (senior auxiliary health worker) also joined them as a team leader and made necessary advice /suggestions. We used the model: Rossmax swiss WB101 as the bodyweight measurement device. Their blood pressure was measured using the blood pressure measuring device model: TaiDoc TD-3124. Not only people from the target community but other community people who were willing to come were also accepted to join the health monitoring. Peer education by the trained local volunteer was also conducted in parallel, to motivate people to know their own health data and its interpretation, so as to practice healthy behavior to keep those values fine. The educators used the visual material for teaching about lifestyle-related diseases, especially how to practice a healthy diet. The monthly schedule of the health monitoring session was made and shared by all the team members in the regular meeting with the leadership of the program management committee that consists of the representatives of the local community. Twenty-six sessions were conducted in total throughout the program period. Near the end of the program, about 30 to 50 people participated in each time.

Figure 1. Algorithm of the capability approach to reduce the risk of lifestyle-related disease (individual level)

Evaluation of the Effect of the Program

One-group pretest-posttest research design was used to evaluate the effect of our program. We determined the sample size using G Power 3.1.9.2. To examine the significance between before and after the program intervention using χ^2 test, it was found that at least 96 subjects are required when the effect size=0.5, alpha level= 0.01, power=0.95 and the drop-out rate is estimated as 25%. Based on this, we picked up one adult person each from all 100 households in the target community, Gairegaon. The total sample size became 104 because we picked two persons from 4 households which had two separate kitchens to cook meals. As the pretest, we conducted the baseline survey in December 2017 on the 104 participants to know the

situation before conducting the program activities. Measurement of height, weight and blood pressure, a semi-structured questionnaire which was asked orally and recorded by the interviewer, focus group discussions and direct observations were used as the tools of data collection. One year after the baseline survey, the last survey was done as the posttest to measure the outcome of the program. Collected data were statistically analyzed using the software of Excel and SPSS ver. 24.25. A chi-square test was used to examine the significance of the difference in BMI and Blood Pressure value between the pretest and posttest. A p-value of 0.05 or below was considered as a statistically significant level.

Results

Out of 104 participants, 87 were female and 17 were male with the age ranging 52 ± 8.99 years in female and 57 ± 7.38 years in male. The ethnicity consisted of Brahmins/Chettris 39%, Dalits 40%, Janajatis 17% and Muslims 4%, respectively. We assessed the level of achievement by comparing the values between the two surveys. Following is the result of outcome regarding knowledge, practice and change in BMIs as well as hypertension prevalence.

Change of Knowledge after the Intervention

The average score of a test assessing knowledge level about lifestyle-related diseases among the participants gained from 63.8 to 94.6 after the intervention. The assessment test included questions about the cause of lifestyle-related diseases, nutrients consisting of different food items, the effect of junk foods on health. etc. The most obviously changed knowledge was about the cause of lifestyle-related diseases. Before the intervention, more than half (54.8%) of people believed the cause of lifestyle-related diseases was a virus, but 97.1% of the participants knew obesity to be a cause of lifestyle-related diseases after the intervention, raised from the previous rate 31.7%.

Change of Dietary Practice after the Intervention

At the baseline survey, the ratio of participants who put more than 2 teaspoons sugar in a cup of tea was 33.7%, which was reduced to 2% after the intervention.

Figure 2. Sugar consumption with tea

After the intervention, people who can make 4 types or more bean dishes except dal soup increased from 15.4 % to 31.4 %. Likewise, people who can make more than 4 kinds of dried vegetable dishes increased from 16.4% to 32.3%. People who consume Junk foods more than 3 times or more per week decreased from 20.2% to 7.6%.

Change of BMI after the Intervention

Each participant's BMI was calculated from height and weight. We defined normal range as BMI 18.5-24.9 kg/m², underweight as BMI less than 18.5 kg/m² and overweight as BMI 25 kg/m² or more.

The overweight was seen among 19.5% of women and 23.5% of men in the baseline. After the program, the last survey data showed overweight among 12.6% of women and 17.6% of men. The underweight seen in the baseline was 9.1% among women and 23.5% among men, whereas underweight seen in the last survey was 8.0% among women and 23.5% among men.

As a result, the percentage of normal BMI among both women and men was significantly increased from 68.2% to 75.9% ($\chi^2=12.091$, $df=1$, $p=0.001<0.05$) after the program.

Table 1. *Change of BMI after the programme*

Change of Blood Pressure after the Intervention

Hypertension was defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg. Prehypertension was defined as systolic blood pressure 120–139 mmHg and diastolic BP 80–89 mmHg.

In the baseline data, the prevalence of prehypertension and hypertension was 37.5% and 22.1%, respectively. In the last survey, the ratio of prehypertension and hypertension was seen as 30.8% and 9.6% respectively, indicating the prevalence of both prehypertension and hypertension decreased. As a result, the ratio of normal blood pressure significantly increased from 40.4% to 59.6% ($\chi^2=8.453$, $df=1$, $p=0.001<0.05$) after the program.

Table 2. *Change of blood pressure after the program*

Discussion

There are not so many studies conducted on BMI in Nepal, but a study conducted in Kathmandu [Amatya, 2014] reported that 37% was overweight, 5% was obese and 1% was underweight, resulting in 57% was in the normal range. Another study [Poudel, 2018] conducted in the urban and semi-rural area in Chitwan reported that 33% was overweight, 4% was obese and 7% was underweight and 46% was in the normal range. Their study showed a higher overweight/obese rate than that of our survey (overweight 20.2% in total) and very low underweight rate comparing to our result (underweight 11.5% in total). This would be due to the place where the study was conducted. Kathmandu and Chitwan are the areas where people do not need to do heavy physical activities in daily life because of convenient environment and transportation facilities and have more accessibility to high calorie and various foods/drink items.

According to the global data in 2013, the prevalence of overweight in Nepal increased from 9% in 1990 to 12% in 2013. [Helble & Francisco, 2017]. Our present study in the remote village in the mountain area showed overweight as high as 20.2% which was higher than the overweight prevalence of all Nepal in 2013 which was reported only 5 years before, indicating a rapid increase of overweight seen even in the rural remote. The high overweight and the high underweight cases show that there is a double burden of underweight and overweight existing in the program area. After the intervention, the burden of overweight was reduced in both sexes, though the improvement was more prominent in women who take more responsibilities of getting foods and cooking.

In a community-based study in Kathmandu, the prevalence of hypertension was 32.5% (95% CI: 28.7–36.3) [Dhungana, 2016] and in another study in Dhulikhel was 28.9% [Koju, 2010]; both were slightly higher than our data 22.1%.

Even though after one year's intervention, an improvement in the BMI and blood pressure was already ascertained. At the end of the program, most of the target community members know

their own body weight and blood pressure. They are also aware of whether their own values are normal or not, and how those can be got closer to the normal range or kept within the healthy value. The survey showed that the majority of them got to understand what kind of behavior change is necessary to reduce the risk of lifestyle-related diseases after the program. Thus, our hypothesis: illiterate/semi-literate people also can acquire the basic knowledge and skills to protect themselves from the risk of lifestyle-related diseases through capability approach had been verified.

This is a pilot program on community health promotion through local villagers' participation from planning, monitoring and evaluation processes. So, villagers do not merely accept ready-made activities but do a continuous revision based on their real needs and situations. The project management committee which consists of 15 representatives of villagers played a vital role. The committee managed to solve the problem of difficulty to access the health monitoring for elderly/disabled citizens by adding two venues as the outreach services, also starting door to door visits. We have verified monthly conduction of the health monitoring still continued in December 2019, four months after the phase-out of the program. The chairperson of the committee who is also the ward chairperson already mentioned that necessary money to run the project should be secured from the ward annual budget showing the political commitment of the local government.

Conclusion

It is found there is a double burden of underweight and overweight existed in the target community in Macchapucchare RM-6. Health monitoring together with peer education worked well to modify people's behavior to reduce the prevalence of overweight and hypertension that is the risk of lifestyle-related diseases. Our pilot program on a small population proved that the community-led intervention model with the capability approach is effective and suitable in a resource-limited setting. Further validation of this approach model seems to be necessary by applying in the larger population.

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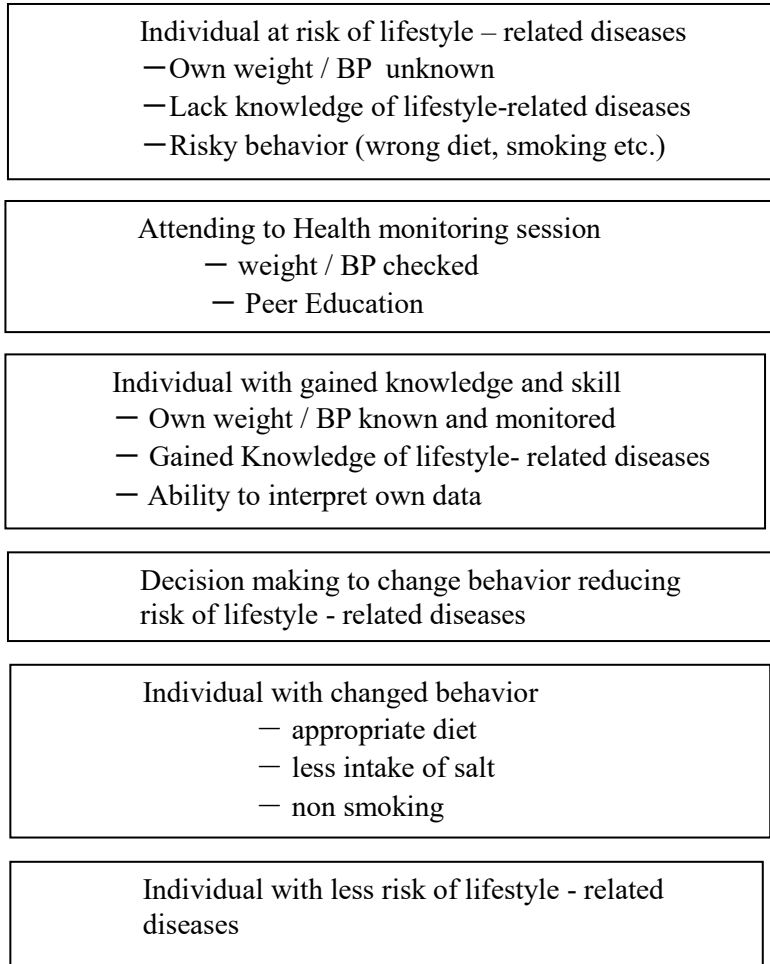


Figure 2. Sugar consumption with tea

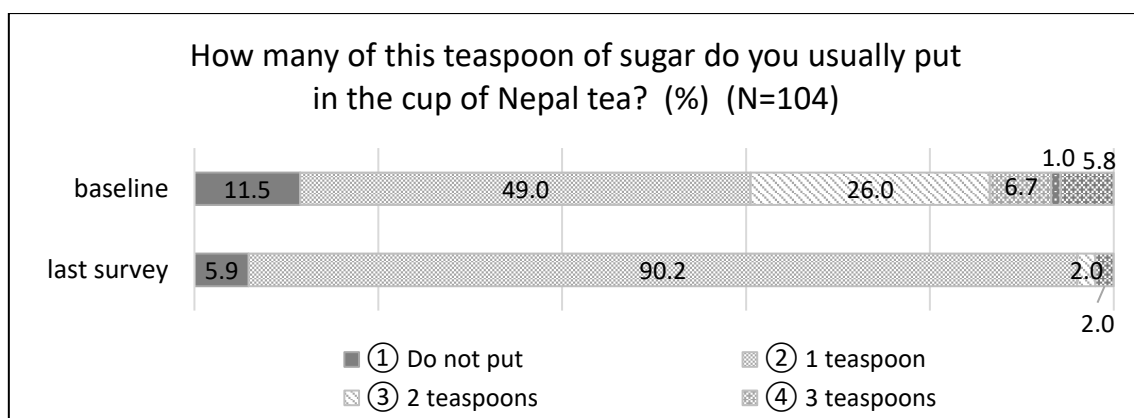


Table 1. Change of BMI after the program N=104

		Underweight	Normal	Overweight
Baseline	male	4 (23.5%)	9 (52.9%)	4 (23.5%)
	Female	8 (9.1%)	62 (71.3%)	17 (19.5%)
	total	12 (11.5%)	71 (68.2%)	21 (20.2%)
After the Intervention	male	4 (23.5%)	10 (58.8%)	3 (17.6%)
	female	7 (8.0%)	69 (79.3%)	11 (12.6%)
	total	11 (10.6%)	79 (75.9%)	14 (13.5%)

Table 2. Change of blood pressure after the program N=104

	Normal	Pre hypertension	Hypertension
Baseline	42 (40.4%)	39 (37.5%)	23 (22.1%)
After the Intervention	62 (59.6%)	32 (30.8%)	10 (9.6%)