

The “Healthy Akame!” community – government – university collaboration for health: a community-based participatory mixed-method approach to address health issue in rural Japan

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Abstract

Background: Although Japan has a decentralized public health system, local governments have considered expert opinions over those of the community, to decide on public health programs. Differences in community's interest may create gaps between health program's objectives and implementation. We hypothesized that community-based participatory research (CBPR), which involves the community at every step, promotes effective program implementation and community empowerment. This study addressed the first step of CBPR, assessing community needs and developing a tailored health program for a rural community in Japan. Methods: in this study sequential exploratory mixed-method study (qualitative followed by quantitative), we first formed a community advisory board (CAB) representing community organization, city officials, and university researchers. The CAB conducted group discussions with community residents to identify community's health issues and strength. These group discussions were analyzed using thematic analysis, and the results were used to develop a questionnaire, which was subsequently sent to all households in the community to obtain priority scores for health issues and proposed action and to assess willingness to participate in community health program. The CAB then designed a program based using the overall study results. Results: Ten group discussions with 68 participants identified the following health issues: 1) diseases, 2) unhealthy behaviors; and 3) unsupportive environment. Nature, vacant lots, and local farms were considered local strength. Of a total of 1470 households in the community, questionnaires were collected from 773 households. Cancer, lifestyle-related diseases, and cerebrovascular diseases were as the most important health problems. Improving services and access to medical checkups, use of public space for exercise, local farming, and collaboration with community health office were considered necessary to address these health problems. Considering feasibility and the availability of resources in the community, the CAB decided to focus on lifestyle-related diseases and designed activities centered on health awareness, nutrition, and exercise. These activities drew on community's strengths and were adapted to Japanese culture. Conclusions: The community's priority health problem was closely related to the epidemiology of diseases. The CBPR approach was useful for identifying community's needs and for designing a unique community health program that made use of local strengths.

Background

Public health programs are commonly designed as one-fit for all, directed for the whole target population instead of individually customized. Studies of health promotion and prevention generally started from diseases which are epidemiologically prevalent, have high morbidity and mortality, or have high cost to manage. For instance, Japan has problems of ageing society with high cost of long-term care(1) and cancer as the leading cause of death (2). The government has designed various programs to tackle the problems, such as the cancer screening program and healthy ageing promotions. However, the utilization of screening program was still low, and the healthy ageing programs were mostly participated by older person only.(3,4)

Differences in community interest and values might create gaps between health program's objectives and its implementation in the community. Community values, culture, resources, social construct, and a lot of variables in the community might affect community's perception toward the program and its outcome. A study conducted in Denmark showed that there was a gap between users and providers perception about health promotion services.(5) By filling these gaps, public health programs and community interventions would be conducted more effectively.

In this study, we hypothesized that implementation of community-based participatory research (CBPR) can be a solution to fill the gaps. CBPR is a form of action research, in which the study is done **with** people, not done **on** or **to** people. In the process, CBPR involve community in every step from assessing community needs, planning, executing, and evaluation of the program. Therefore, it fits for health promotion which is supposed to enable people to take action, increase control over the determinants of health, and improve their health.(6) In addition, collaboration and equal partnership with community in CBPR can create a sense of ownership to the program, increasing the chance of program's sustainability.

Considering limited resources and other restrictions, it is necessary to identify the priority of health needs in the community. It is also an important first step in CBPR to assess community needs in order to develop tailored program accordingly. Previous studies had used CBPR approach to identify community health needs(7,8), or to understand community's perception regarding a certain health issue.(9) Along with the process of identifying community needs, researchers could also evaluate the potential challenges as well as strength in the community.

How do people in rural Japan area perceived health issues in their community, and how do they address the health issues? At the time this study started, the authors did not find any literature which gave light on this issue. Therefore, in this first step of our CBPR project, we collaborated with a community and its stakeholders in the area. Our study aimed to assess community's health needs, identify community's strength, and develop a tailored program that could address their needs by maximizing the use of local resources.

Methods

Study design

This study implemented community-based participatory research (CBPR) which involved community partners in the whole process of from the planning, execution, evaluation, and reflection of the intervention (addressed as program in this study).(10) In this paper, we reported the first part of CBPR, consisted of community needs assessment and program development which applied sequential exploratory mixed-method (qualitative study followed by quantitative study).

Setting

This first step of our CBPR project took place from July 2017 to October 2018 in Akame region of Nabari city. Nabari city is a small city located in rural area of central Japan. It is one of the cities with “unique” policy on health promotion program within Japan. They have community health office (*machi no hoken shitsu*) for each of the 15 regions in the city. Initially build to support long-term care in the community, the office then developed into consultation place for all ages, from child health to older adults’ caregiving issues. It also serves to support community health promotion and prevention activities.(11)

Nabari city also initiated healthy community project (*machi juu genki*) in 2015, recruiting volunteers to become community health leaders. As one of the city with high proportion of older adults, this project aimed to promote healthy lifestyle and prevent long-term care.(12) Some parts of the city’s health promotion budget is distributed to each community development organization (*machi zukuri iinka*) to support this project.

Each community was given the freedom to decide on their health project activities. There was no control and evaluation of how the budget was spend, nor standardized evaluation of health activities in each community. Many activities designed were eventual with no clear goals nor objective evaluation. Majority of the activities were conducted in the weekdays and therefore mostly attended by older residents who have retired from work. Our research team from Mie University collaborated with Nabari city officials and community members aiming to design a community-based health program which is more structured, evaluable, sustainable, and can attract broad audience in the community.

Community engagement

The city officials introduced university researchers to potential partner community. First, the university researchers visited the community and had meeting with community development organization representatives and staff of community health office. The community representatives, city officials, and university researcher agreed that an iterative process is necessary to develop a sustainable program. After the initial meeting, university researchers participated in health-related and social activities in community to familiarize with and to observe community’s culture.

Establishment of community advisory board (CAB)

To design the study, we established a community advisory board (CAB) that represented community organization, city officials, and university researcher. Members from the community were recruited by recommendation from the leaders of community organization. Fifteen members were initially recruited from community organization, and additional 5 members were recruited from community health leaders (who were recruited and trained by the city). In addition to 2 city officials who oversaw the community, 2 staff of community health office, 2 university researchers, and 1 physician from the city hospital, the CAB had 27 members in total. All CAB members had equal rights, and each played their role. University researchers were responsible for all procedure necessary for the research. Community partners played role as bridge to the community to recruit participants, gathering data, and give contextual insight for the

findings. Study design, program planning, and all decisions that affect the program were discussed in CAB meeting.

Data collection

Our target participants were adult residents (age 20-year-old or older) in community who were capable to make decisions independently. First, we conducted qualitative study to assess people's perspective about health issues in the community, community's strength, and proposed ways to solve the issue. CAB held a community forum (world café) with community residents from various age group and gender.

Participants of the forum were divided into 10 groups of 6-7 people, each facilitated by one CAB member. Each group representative shared the group discussion's summary to all participants. Discussions in each group were recorded and transcribed verbatim for qualitative analysis.

Second, a quantitative questionnaire survey was conducted to score the importance of health issues and proposed action. Items in questionnaire was developed by the categories extracted in the qualitative analysis above. All the items were measured with 5-point Likert scale (1 is least important, 5 is most important). Afterwards, self-administered questionnaires were distributed to all households in the community and collected anonymously. We also gathered data about respondents' prevention practice, past participation in community activities, community identity and commitment to community (will be explained in another paper), and willingness to participate in community health promotion program. Representatives of each sub-region helped to distribute and collect the questionnaire.

Analysis

Qualitative data was analyzed with thematic analysis.(13) Initial qualitative analysis was conducted with NVivo 10 software(14) to extract keywords, generate codes, and categorize into themes. The 1st and 2nd authors re-visited the data to check codes, categories, and themes to make connection among themes. Themes, categories, and quotes are presented in table form for better understanding.

Participants' sociodemographic data, health issues priority score, proposed action score, prevention practice, past participation in community health activities, community identity, commitment to community, and willingness to participate in community health program were presented in descriptive statistics. To see how predictor variables (sex, age group, education background, prevention practice, past participation in community activities, community identity, commitment to community) determined willingness to participate in community health program, we conducted logistic regression analysis. Model with lowest Akaike Information Criterion (AIC), lowest residual sum of squared (R^2), and highest Nagelkerke Pseudo R^2 was chosen as best fit model. Multicollinearity was confirmed using variance inflation factor. Statistical analysis was conducted with R version 3.5.2(15) with readxl(16), psych(17), tidyverse(18), dplyr(19), DAAG(20), and BaylorEdPsych(21) packages. CAB discussed both quantitative and qualitative results to discuss priority issue and develop a one-year health program.

Results

Qualitative results

Community forum was attended by 68 participants, 10 young adults (20 to 40 years old), 18 middle-age people (41-64 years old), and 40 older adults (65 years old and above). More than half of participants were female. When the participants discussed about “health”, they shared similar goal: to be able to life independently for as long as possible (longer healthy life expectancy).

The group discussions generated the following sub-themes for health issues: 1) Diseases, 2) Unhealthy habits, and 3) Unsupportive environment. Participants discussed that health problems were not only the existence of diseases, but also about the unhealthy behavior and the environment that did not support healthy behavior. In addition, mental health was also considered as important, such as stress, depression, and dementia. The discussions also emphasized the importance of social connection and communication.

Nature, existing community networks and communication platform were considered as community’s strength that has potential to improve people health in the community. The area was surrounded by beautiful forest, waterfall, parks, and fertile land. The surrounding nature was thought of having the potential not only as tourism spot, but also place to exercise (walking, hiking, etc.). Many people in the community farmed, from small housing scale to large commercial scale. The farming activity was thought as beneficial for keeping people physically active, and the older generation could teach the younger generation. If the community has farmers’ market that sell vegetables produced locally with prices more affordable than supermarket, the residents in community could also obtain healthy ingredients more easily. The existence of community health office, community sports and social club, were considered as potential network that could strengthen community capacity.

Other than improvement inside the community, improvement of services and access to health facility for medical checkup were also considered important. There were only few clinics located in the neighborhood, and no facility provided comprehensive medical checkup and screening. To get various cancer screening, residents must go around to several different places. Public transportation did not pass the area frequent enough, so access to healthcare facility was difficult especially for the older adults. Relationship of each themes were explained as diagram in figure 1. Table 1 provided themes, categories, and quotation in details.

Table 1. Perspective on health issues, community strength, and proposed solution

Theme	Sub-theme	Categories	Quotes	
Goal	Staying independent until death		<i>Our deepest wish is pin-pin-korori (to die suddenly and painlessly after living a long and healthy life)</i>	
Health Issues	Diseases	<ul style="list-style-type: none"> - Cancer - Cerebrovascular diseases - Life-style related diseases (metabolic syndrome, hypertension, diabetes mellitus, obesity) - Cardiovascular disease - Musculoskeletal diseases/illness - Mental health problems 	<p><i>There are many cancer survivors. What I fear is the fact that some people died from cancer. They died suddenly immediately after their retirement...</i></p> <p><i>Our issues were lifestyle disease, lack of place for exercise and lack of venue for community's communication.</i></p> <p><i>Building up stress is most damaging to your health</i></p>	
		Unhealthy behavior	<ul style="list-style-type: none"> - Smoking - Alcohol drinking - Unhealthy diet - Sedentary lifestyle - Low participation in medical checkup and screening 	<p><i>You keep smoking although it is not good for health.</i></p> <p><i>Now, lifestyle is westernized prefers meats a lot, it is fatty with accumulated cholesterol.</i></p> <p><i>... You don't see people walking outside, like someone who mentioned lack of exercise earlier.</i></p>
		Unsupportive environment	<ul style="list-style-type: none"> - Lack of places to exercise - Costly vegetables - Lack of medical facility that offer comprehensive checkup - Difficult to access medical facilities - Lack in information dissemination 	<p><i>We have neither playground nor community for people that help us exercise</i></p> <p><i>Vegetable prices sharply rose and leafy vegetables do not last long. We do not eat much vegetables</i></p> <p><i>Transportation to the hospital is not convenient although there are more and more older people</i></p>

Community's strength	Nature	<ul style="list-style-type: none"> - Mountain area, waterfall, etc - Fertile land 	<i>Akame is rich in nature, we should make better use of it to improve our mental and physical health</i>
	Network	<ul style="list-style-type: none"> - Community health office - Sports and social clubs 	<i>I think our advantage is that we have Machi no hoken-shitsu</i>
	Communication platform	<ul style="list-style-type: none"> - Meet up events - Local newsletter 	<i>We should make better use of facilities such as Fureai Café.</i>
Proposed solution	Improve health care services and access	<ul style="list-style-type: none"> - Services, facilities, and access for medical checkup - Community bus 	<i>It is very troublesome to take older people to different hospitals for different check-ups. We need a program that offer comprehensive medical check-ups at one place for reduced cost.</i>
	Utilize local strength	<ul style="list-style-type: none"> - Public facility for exercise 	<i>I hope Yume Hiroba will be open to public regularly.</i>
		<ul style="list-style-type: none"> - Local farmers market and agriculture class 	<i>Cooking practice using locally grown vegetables.</i>
	Strengthen community capacity	<ul style="list-style-type: none"> - Inter-generation communication - Role model and health leader 	<i>Their horizons will be broadened if there is a place to frankly exchange information irrespective of age, generation and region, like we had today.</i>
Facilitate behavior change		<ul style="list-style-type: none"> - Exercise/sports class and event 	<i>We should ask each other to go for a walk.</i>
		<ul style="list-style-type: none"> - Information dissemination 	<i>I want guidance on nutritional balance.</i>
		<ul style="list-style-type: none"> - Nutritional education and cooking class 	<i>If we can be connected with the information on daily basis, it would change our mind.</i>
		<ul style="list-style-type: none"> - Smoking cessation program 	

Quantitative results

From 1470 households, 773 questionnaires were collected. We categorized participants into 3 age groups; young adults (20 to 40-year-old), middle-age (41 to 64-year-old), and older adults (≥65-year-old). The proportion of male and female respondents was balanced. Majority of respondents graduated from

high school or above and were still working. More than half respondents reported that they practice preventive behaviors, with healthy diet, going for medical checkup, and not smoking as the most frequent choices. More than half participants seldom or never attended health-related activities in their community. Details on participants' characteristics are described in Table 2.

The proportion of people willing and unwilling to attend community health program was similar, with people above 60s were more likely to attend. We asked participants to answer the reasons for not attending, and the top answers were work-related (e.g. do not have time because work is busy, too tired working on weekdays so wants to rest on weekend, thinking of going after retiring). The other reasons for not attending were: busy as caregiver (for older family members or children), unwilling to do it in group (wants to do in own pace, wants to avoid troubles with other people, shy in front of other people, etc.), and because there was no friend in the same age to attend with.

We asked participants to score the importance of health issues and proposed action using Likert scale from 1 (not important) to 5 (very important). The score was calculated for each item and ranked for each age group (Table 3). For all age group, diseases-related health issues were considered of high importance (cancer, cerebrovascular disease, lifestyle-related diseases). For the proposed action, participants expected that improving services and access to medical checkup, opening vacant lot as public open space for exercise, and collaboration with community health office would improve their health.

Table 2. Participants' characteristics, health prevention practice, participation in community

Characteristic	Frequency (%)	Mean ± SD (range)
Age (years)		64.3 (20 to 93)
Sex		
Male	387 (50.0)	
Female	381 (49.3)	
Educational background		
Elementary – Junior high school	85 (11.0)	
High school	415 (53.7)	
Vocational College/ University	250 (32.3)	
Employment status		
Employed	396 (51.2)	
Unemployed	355 (45.9)	
Opinion on health prevention		
Important	714 (92.3)	
Not important	7 (0.9)	
Do not know	53 (6.8)	
Health prevention practice		
Exercise	369 (47.7)	
Healthy diet	417 (53.9)	
Vaccination	284 (36.7)	
Medical check-up	451 (58.3)	
Not smoking	455 (58.9)	
Not drinking alcohol	261 (33.8)	
Others	38 (4.9)	

Barriers to healthy lifestyle/ health prevention	
Lack of time	138 (17.8)
Lack of willingness	106 (13.7)
No companion	45 (5.8)
Lack of facility	66 (8.5)
Do not how to start/ what to do	84 (10.9)
Others	21 (2.7)
Participation in community activities	
Frequent	119 (15.4)
Seldom	430 (55.6)
Rarely/ never	
Community identity	64.3 ± 19.1
Feel common bond to community	17.5 ± 5.3
Feel common identity to community	16.4 ± 5.5
Commitment to community	13.9 ± 4.4
Willingness to attend community health activity	
Yes	351 (45.4)
No	328 (42.4)
Not sure	95 (12.2)

Table 3. Priority ranks for health problems and proposed action

Health Issue	Score (rank) by age group			Proposed Action	Score (rank) by age group		
	Young adults	Middle-age	Older adults		Young adults	Middle-age	Older adults
Cancer	190 (1)	1242 (1)	1428 (1)	Integrated medical check-up in one facility	194 (1)	1130 (1)	1269 (2)
Lifestyle-related diseases (metabolic syndrome, obesity, hypertension, diabetes mellitus)	179 (3)	1220 (2)	1292 (3)		Affordable and accessible medical check-up	188 (2)	1130 (1)
Cerebrovascular disease	179 (3)	1148 (3)	1413 (2)	Community bus	151	1015 (2)	1279 (1)
Cardiovascular disease	159	1058 (5)	1247 (4)	Collaboration with community health office	157	983 (3)	1177 (4)
Musculoskeletal disease	137	951	1022				
Mental health problems	159	938	951	Utilizing open space as exercise place	183 (3)	974 (4)	1050
Sedentary lifestyle	180 (2)	1029	1123	Local farmers market	165 (4)	953 (5)	969
Unhealthy diet	159	916	1005	Exercise class and sports events	163 (5)	937	1047
Alcoholism	120	693	701	Nutritional education and healthy cooking class	146	879	995
Smoking	110	618	641				
Lack of health services and access to medical facilities	165 (5)	1064 (4)	1178 (5)	Agriculture class	133	953 (5)	969
				Smoking cessation program	119	755	799
Lack of public facility to exercise	169 (4)	977	1085	Role model and health leader	140	872	1011
Lack of information	156	941	1082	Inter-generation meet up	150	819	958
Low medical check-up rate	147	926	1033	Improving information dissemination	160	943	1135 (5)

Numbers in bracket () show the top 5 of highest priority score. Some items received same total score and shared the rank.

Table 4. Regression model for determinants of participation in community health program^a

Predictor Variables ^b	b	SE of b	OR	95% CI of OR
Female	0.47	0.19	1.61	1.09 to 2.37
Unemployed	- 0.26	0.23	0.78	0.49 to 1.21
Education				
Elementary school/ Junior high	reference			
Senior high	- 0.38	0.35	0.68	0.34 to 1.36
College/ University	- 0.76	0.37	0.47	0.22 to 0.95
Age Group				
Young adults	reference			
Middle-age	- 0.02	0.36	0.98	0.48 to 2.00
Older adults	0.42	0.39	1.53	0.71 to 3.34
Participation in community activities				
Never/ seldom	reference			
Sometimes	1.13	0.34	3.11	1.63 to 6.20
Frequent	1.14	0.25	3.13	1.95 to 5.14
Prevention practice				
Low	reference			
Intermediate	0.33	0.22	1.39	0.91 to 2.12
High	0.66	0.26	1.94	1.16 to 3.26
Consider health prevention as important	0.22	1.13	1.25	0.12 to 13.29
High common bond to community	- 0.11	0.23	0.89	0.57 to 1.41
High common identity to community	0.19	0.23	1.21	0.76 to 1.91
High commitment to community	0.65	0.23	1.92	1.23 to 3.02

Test: AIC = 704, Nagelkerke pseudo R² = 0.19

No predictor variable caused multicollinearity.

^a Criterion variable: Willingness to attend community health activities (yes/no)

^b Predictor variables (full): age group, sex, educational background, employment status, importance of health prevention, health prevention practice, participation in community activities, community identity (common bond to community, common identity to community), commitment to community

We conducted logistic regression analysis to see which of the respondents' characteristic that contributed to their willingness to participate in community health program. The predictors with significant contribution were female, moderate to frequent past participation in community activities, practiced more preventive behavior, and high commitment for the community were more likely to attend community health program (table 4).

Priority Decision and Program Development

Top priority for health issue was cancer, and improving health care service for medical checkup for the proposed action. Cancer has multifactor risks and the outcome was hard to see in short term. Likewise, improving health care services was beyond reach and CAB could only advocate for it. In addition, the city has actually been conducting mobile integrated cancer screening program in public places such as community center, public health center, and city office.(22) Therefore, advocating integrated cancer screening facility was not priority. Rather than that, circulating the information about mobile integrated screening program was more realistic. Considering the feasibility, CAB decided to tackle the next health issue in the priority list which they can work on, has direct health/social outcome and intermediate health promotion outcome that can be evaluated in relatively short time: lifestyle-related diseases.

To make advantage of the local resources, the main activities centered on 3 themes: health, exercise, and nutrition. For health themes, health education classes were scheduled to raise awareness and knowledge, and health measurements were planned to give participants information regarding their health status. Healthy cooking classes and community cafeteria were planned to use local ingredients provided by local farmers, and to provide chance for social meeting. At the same day, farmers market will be held to promote local farming products. We developed health diary to record exercise and health measurement results. We also introduced food record and measured dietary intake to promote healthy balance diet. Utilization of vacant lot in community, walking events around the area, and exercise classes were planned to endorse physically active lifestyle. Activities were mainly planned in the weekend to attract the working generations to attend.

Discussion

Priority Health Issue

Both participants in group discussion and questionnaire survey put priority on diseases as health issues they were concerned about. Among the number of diseases mentioned, cancer was the priority for all age group. Cancer has been number one cause of death in Japan, and also huge contributor as the cause of long-term care needs.(2) There have been various campaign about cancer, so it was expected to be one of the concern for community members.

Lifestyle-related diseases (metabolic syndrome, obesity, hypertension, diabetes mellitus) and cerebrovascular diseases came as the second and third rank in the priority score. For middle-age group participants lifestyle-related diseases rank higher than cerebrovascular diseases, and vice versa for older adult group. This result resonates with the onset of the respective diseases. Type 2 diabetes mellitus and hypertension can be found from middle-age adulthood, and even earlier in young adults.(23,24) Meanwhile, the average onset of cerebrovascular disease is in the later adulthood, affecting more older adults compare to middle-age and young adults.(25) It showed that people's concern and decision of priority for health problems reflected the epidemiology of the diseases, which might have affected the individual or their family and relatives.

While participants in group discussion put emphasize on unhealthy behavior problems, the questionnaire survey results showed that unhealthy behaviors were not in the top 5 priorities. It was peculiar to see that despite lifestyle-related diseases was ranked high for all age groups, the unhealthy behaviors which cause the lifestyle-related diseases were not considered as important. This result showed that majority of people's perspective about health still centered in the absence or existence of diseases, lacking the recognition of unhealthy behaviors as risk factors for the diseases. Those who attended the community forum and participated in group discussion might be people who have higher awareness about health, thus they put on the importance of unhealthy behaviors problem. Rongen, et al identified that participants with positive attitude toward health promotion, belief that health promotion was good, and perceived that they need to improve their health, were more likely to attend health promotion program in workplace.(26) Another study conducted in Japan regarding the knowledge about cancer's risk factors showed that majority of respondents answered infection as the most attributable factor for cancer, higher than other lifestyle-related risk factors.(27) Our study participants' might also have different perception about risk factor to diseases, and it requires further investigation to confirm it.

Smoking and alcohol drinking were least prioritized, placing last in all age group. From the prevention practice, we can see that only around 58% participants practiced non-smoking, and even less who practiced no alcohol drinking (33.8%). It means large numbers of participants were drinking alcohol and smoking. This number is higher than the Japan's national average of smoking which is 17.8% for all adult population.(28) Japan has enforced several policies on smoking that resulted in decrease number of adult smokers from 21.8% (male 36.8%, female 9.1%) in 2008 to 17.8% (male 29%, female 9.1%) in 2018.(29) However, the daily smoking percentage in overall is still high.(30) In the past decade, the percentage of smoking in enclosed space (school, offices, restaurant, etc.) has been decreasing significantly, but not

in open space (public transportation area, kids playground, street, etc.).(29) Compared to other OECD countries, Japan's anti-smoking policy is still lacking and further enforcement is necessary to foster a free smoking environment.(28) In addition to that, drinking alcohol is common in daily life, with a lot of social meeting come along *nomikai* (drinking party).(31–34) Since smoking and drinking alcohol have become part of the Japanese social life, it might be more difficult for people to see and perceive them as problem. The harm effect of alcohol and tobacco consumption for health are well-known and have been researched extensively.(35–37) Tackling these two problems will reduce risk factor for diseases and beneficial for people's health. It will take government's commitment for policy and program enforcement, as well as social norm change to raise awareness about the harm of tobacco and alcohol, and its effect on health and society.

Amidst the lack of recognition of unhealthy behavior as important health issues, young adult respondents of questionnaire survey chose sedentary lifestyle and lack of public facility to exercise in the top 5 for priority health issues. It reflected that the young adults who responded to the questionnaire might have better understanding about the health consequences of physical inactivity and felt that availability of public places for exercise can facilitate them to resolve the problem.

Plan of Action

Relevant to cancer as the top priority health issue, respondents of our study chose improvement of medical checkup facilities and access to the medical facilities as first proposed action. Respondents in the group discussion raised the problem of having no hospital that provide all cancer screening covered by the national program (lung cancer, gastric cancer, colorectal cancer, prostate cancer, breast cancer, and cervical cancer). According to Nabari city data, there are 2 hospitals and 64 clinics in the city.(38) Among them 34 facilities have been providing cancer screening services for the city residents but none provide all cancer screening.(39) In the community we worked with, there was only one clinic that provide screening for prostate cancer, lung cancer, and colorectal cancer. Therefore, people asked for medical facility that can provide integrated cancer screening, so they do not have to go around several medical facilities. In addition to the lack of service, public transportation to access medical facilities in other part of the city was also lacking. The middle-age and older adults especially expected to have community bus for easier access to medical facilities. However, the city has actually been conducting mobile integrated cancer screening program in several places such as community center, public health center, and city office.(22) It seems like this information has not been well-circulated among residents. Since upgrading medical facility was beyond our reach, we can only advocate for it. Meanwhile, improving dissemination of health information, including about mobile cancer screening, was considered more feasible.

Other proposed actions were things that can be improved, or utilization of local resources in the community. Nature was one of thing highlighted during the group discussion. The existing waterfall and mountainous area which were famous for tourism and hiking place were considered as community treasure. Review article written by Maller et al summarized some health benefits of contact with nature,

including being an effective way to relieve stress, improving well-being, and eliciting parasympathetic nervous system which associated with restoration of physical energy.(40)

The fertile land was used by community residents for farming, mostly for family consumption. Opening local farm market can facilitate meeting the needs of consumer, community residents who did not farm and wished to purchase vegetables with more affordable price. It can also provide chance for local farmers to gain profits by selling the extra vegetables that they produce. Like any other rural areas in Japan, household farming activities were mostly done by the older adults.(41) While young and middle-age adults in our study expressed interest for agriculture class to learn farming method or being the consumer of farmer market, the older adult group might not find it important or as interesting, since it was just a routine activity for them.

Collaboration with community health office and improving dissemination of information were also considered as highly necessary for the community. Established 15 years ago, the staff of community health office had been there for the residents, assisting health-related activities in the community.(42) Despite mainly provide consultation service for long-term care and child health, they have been involved in other community activities of all age such as primary school meetings, community center meetings, and activities for the older adults' club.(43) They accepted consultation for child's health, long-term care services for older people, even acted as the neighborhood *onee-chan* (older sister in Japanese) who listen to primary/high school students' worries and gave emotional support for people with mental health/cognitive problems. Therefore, people had high expectation and dependence for their involvement in the community health activities.

Even though internet-based information is getting more popular, majority of respondents in this study considered the local newsletter that was distributed to all households as the best and most feasible option for health-related information dissemination. Study about health information seeking behavior found that those who were younger, more educated, and more internet skilled were better in taking advantage of finding health information from the web.(44) Meanwhile, our participants majority who were older adults might be more comfortable with conservative information dissemination. However, this type of print communication required active information seeking behavior from the readers. If the readers do not actively try to look for health information, then the newsletter will be left unseen and information cannot be transferred to the target. Other forms of communication, which were intergenerational communication and social meet-up event, were highly expected among group discussion participants. Several previous studies have showed benefit of intergenerational activity for expanding social network, also improving health and quality of life of the study participants.(45–48) Unfortunately, it was not considered as highly important for majority of residents who responded to our questionnaire.

Initiation of exercise classes and sports event, as well as utilization of the recently established open space for exercise were pointed as high importance both in the group discussion and questionnaire survey. Being physically active has been proven to lower all-cause of mortality, including from cardiovascular diseases and cancer.(49–51) Promoting physical activity can lower one risk factor to

prevent diseases in the later phase of their life, and open the door for health promotion activity to attract the young target group. In addition to physical activity and exercise program, introduction of healthy diet and cessation of unhealthy behaviors are expected to reduce the prevalence of cardiovascular and metabolic diseases, as well as cancer.(35,49)

Determinants of Participation in Community Health Program

We found that female was more likely to participate in community health program, and this result was found in other previous studies across countries. A recently published study from Canada showed that more rural women wanted to participate compared to men, and men were more likely to report being too busy.(52) Consistently, study in Finnish population also showed that women were more interested in seeking health information.(53) Anderson, et al found that women outnumbering men in program implementation had caused men became more reluctant to participate.(54)

People who have high commitment to their community were more likely to attend community activities in the past and were also willing to participate in the future community health program. In addition, people who had high awareness of healthy behavior and practiced them were also more likely to attend. In contrary, people with higher degree of education (college/university graduates) were less likely to participate. In this area of unlimited information, people can access health information easily with assistance of technology. Jansen et al showed that people with higher education level might also have good health literacy.(55) Therefore, these people might have better in understanding health information, using health care services and resources, and felt less necessary to attend certain program in the community.

Limitations

Participants of this study were mostly older adults, and only few young adults participated. The opinion obtained in this study might not reflected the needs of younger generation, who were also targeted for the program. We also have not involved the local medical practitioner actively in this study. While community needs and opinion for plan of action are important, it is also necessary to receive opinion from the practitioner who provide medical services to the people in the community. The wall between medical and health sector existed in Japan's healthcare. For lay person, medical professionals are considered in higher position so the community members were reluctant and felt afraid that they would burden the busy medical professionals. For better collaboration in the future, the active involvement of medical professionals is essential for the effort of improving people's health. This study was specific for the community we worked with. While other rural Japan communities might have similar characteristics, other values and culture might result in different outcome with our study. However, the research method and approach that we used in our study can be applicable for any other community.

Conclusions

The main health concern in our target community was diseases centered. In relation to that, people expected that improving health care services would improve their health. In addition, utilization of resources in community were also expected to benefit people's health. While results from qualitative study showed importance of unhealthy behavior as health issues, respondents from larger participants in quantitative study felt less necessity to improve personal behavior, such as smoking cessation and reducing alcohol consumption. It showed that people who voluntarily participated in community forum might have better understanding about behavior impact on health. Female, people who had previously participated in community activities, practiced preventive behavior, and had high commitment for community were more likely to participate in community health program.

Utilization of CBPR approach was useful to identify community's perception on health problems, their needs, strength, and determinants to participate in community health program. Understanding these characteristics, the CAB had better insight to develop a tailored community-based health program that was within people's interest and unique to local strength. Involvement of community members who understood community's value had enabled to decide on health issue that was important and feasible to address promptly with available resources. It also helped to develop program that was feasible to conduct and could be sustained in the community.

Declarations

Ethics approval and consent to participate

This study has been approved by Clinical Research Ethics Review Committee of Mie University Graduate School of Medicine/School of Medicine/University Hospital (No. 1767). CAB members, participants in group discussions, and questionnaire's respondents gave consent to participate in the study prior to start of our project.

Consent for publication

Not applicable.

Availability of data and materials

Access to data shall be given upon approval from the research CAB. Please contact corresponding author for request of access.

Competing interest

SI had been hired the endowed faculty which was funded by the government where the study was conducted, and YS receive salary from the city government where the study was conducted. Some members of *Akame Machijuu Genki* Project CAB were employees who receive salary from the city government, and some were members of community organization which parts of the income came from the city government.

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Author's contributions

MANH initially proposed study design and wrote the paper. SI and AMGPCAB contributed to revision of study design. YS and AMGPCAB contributed in data collection and interpretation. MANH and SI analyzed the data. SI, YS, HW, and YT provided critical review, input, and revision to the paper. All authors read and approved the final manuscript.

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Figures

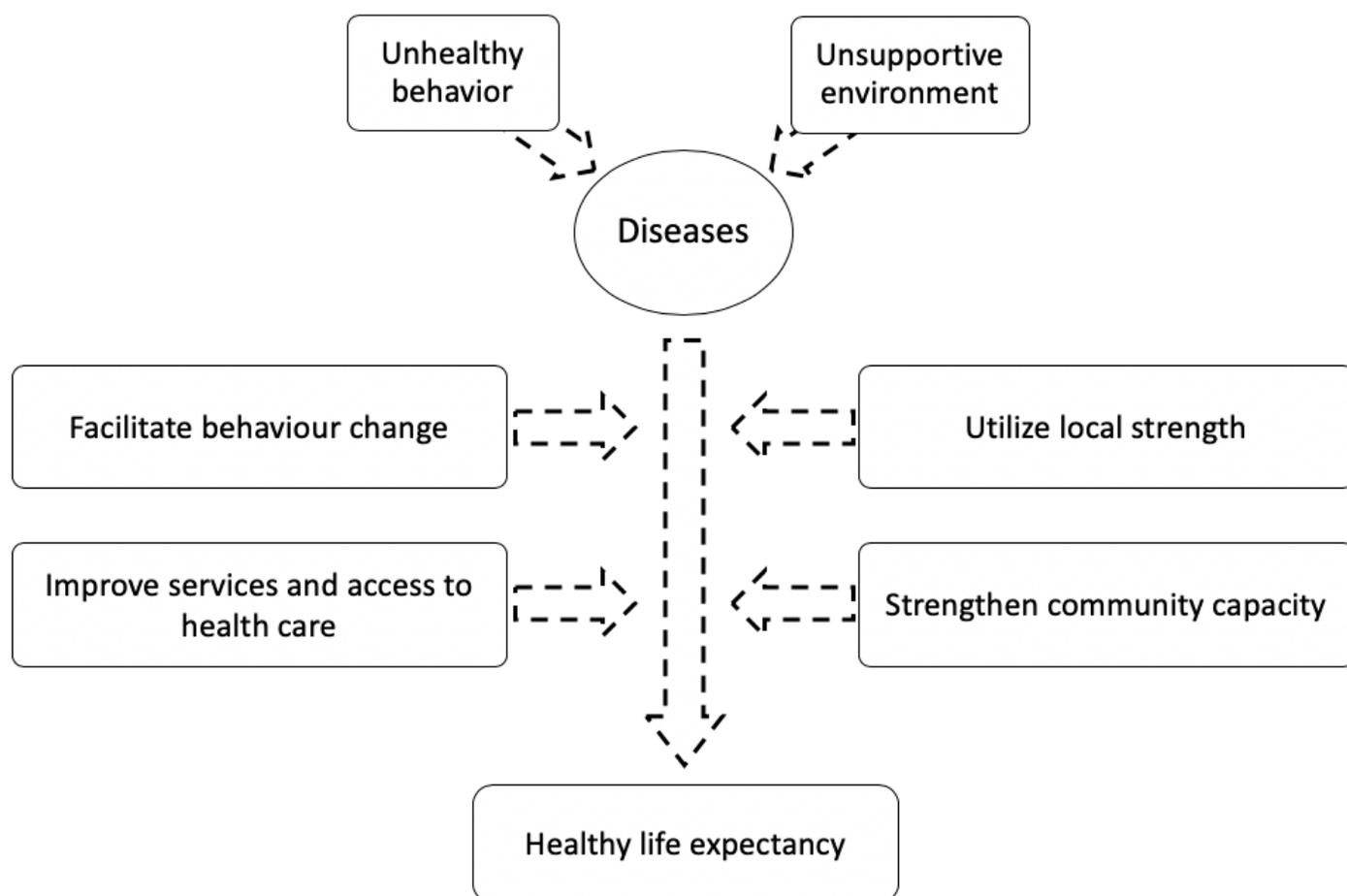


Figure 1

Relationship of health problems, proposed action, and goals in the community. Unhealthy behavior and unsupportive environment were considered as predisposing factors that contribute to diseases, which will affect one's health life expectancy. Improvement of services and access to medical checkup and screening, utilization of local strength and potential, strengthening community capacity, and facilitating behavior change were thought to improve people's health, resulting in longer healthy life expectancy.