

Health Behaviors Before and After the Implementation of a Health Community Organization: Gangwon's Health-Plus Community Program

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Objectives: Community organization is a resident-led movement aimed at creating fundamental social changes in the community by resolving its problems through the organized power of its residents. This study evaluated the effectiveness of health community organization (HCO), Gangwon's Health-Plus community program, implemented from 2013 to 2019 on residents' health behaviors.

Methods: This study had a before-and-after design using 2011-2019 Korea Community Health Survey data. To compare the 3-year periods before and after HCO implementation, the study targeted areas where the HCO had been implemented for 4 years or longer. Therefore, a total of 4512 individuals from 11 areas with HCO start years from 2013 to 2016 were included. Complex sample multi-logistic regression analysis adjusting for demographic characteristics (sex, age, residential area, income level, education level, and HCO start year) was conducted.

Results: HCO implementation was associated with decreased current smoking (adjusted odds ratio [aOR], 0.73; 95% confidence interval [CI], 0.57 to 0.95) and subjective stress recognition (aOR, 0.79; 95% CI, 0.64 to 0.97). Additionally, the HCO was associated with increased walking exercise practice (aOR, 1.39; 95% CI, 1.13 to 1.71), and attempts to control weight (aOR, 1.36; 95% CI, 1.12 to 1.64). No significant negative changes were observed in other health behavior variables.

Conclusions: The HCO seems to have contributed to improving community health indicators. In the future, a follow-up study that analyzes only the effectiveness of the HCO through structured quasi-experimental studies will be needed.

Key words: Community participation, Empowerment, Health promotion, Community organization, Health behavior, Korea Community Health Survey

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INTRODUCTION

Community participation and empowerment have long been emphasized in health promotion programs. As lifestyle habits and social environments have become prominent determinants of health and health disparities have increased, primary health-care focusing on community-based health programs, with community participation as a strategy, has emerged [1]. As an increasing emphasis was placed on individuals' ability to manage and control determinants of health to improve their health status with the concept of health promotion, community em-

powerment through community participation subsequently became a core strategy in health promotion programs [2].

In this context, community-based participatory research (CBPR) has emerged, in which collaborative bodies, including residents who were previously only considered as targets of health programs, participate in researching and practicing interventions to solve health problems and bring about social change [3]. The effectiveness of CBPR in enhancing community health is explained by the CBPR conceptual model, which consists of context, partnership dynamics, research/intervention, and outcomes [4]. The context, which represents socioeconomic and cultural characteristics, influences partnership dynamics (e.g., relationships among partners). Effective partnership dynamics create synergy among partners to develop intervention and research designs. Through participation in interventions developed with a community-centered approach, community partners become empowered and reach outcomes such as health promotion and improvement in health equity. Based on this framework, various achievements of CBPR have been reported [5,6].

In Korea, community-based participatory health promotion programs aimed at empowering communities have emerged. Since the initiation of the Healthy Ban Song pilot project in 2007, various projects such as Gyeongsangnam-do (Province) Health Plus Happiness Plus Project, Gyeongsangbuk-do Health Saemaoul Project, and Seoul's community-based participatory health program entitled "Building Healthy Communities" have been carried out [7]. Various attempts have been made to examine the effects of these community-based participatory health promotion programs [6,8-11].

In Gangwon Province, health community organization (HCO)—Gangwon's Health-Plus community program—was implemented in 20 towns, townships, and neighborhoods (*eup, myeon, dong*—i.e., small-scale administrative units) from 2013 to 2019 [12]. The program was approached from the perspective of the community organization, which is a resident-led movement aimed at creating fundamental social changes in the community by resolving its problems through the organized power of its residents [13]. The community organization is based on community organizing, which involves establishing a system of the power of residents to properly perceive the community and solve its problems. Thus, the concept of empowerment is inherent in the idea of community organization [14].

The HCO in Gangwon Province exhibited several differences from the community-based participatory health program in

other areas. First, it aimed to construct people's organizations based on the principle that residents can solve health problems themselves. The involvement of public health center staff was minimized; instead, coordinators were recruited from the local community to serve as the key personnel. The coordinators met with residents as community organizers and found those who had leadership potential. Second, the HCO was based on the principle of thorough community-centeredness. The composition of the health committee, a people's organization, was based on local residents rather than existing community leaders such as heads of urban villages, rural villages, or hamlets (*ri, tong, ban*—i.e., the smallest administrative district units), community health center staff, and health professionals. The public health center staff and coordinators refrained from suggesting or directly carrying out health committee's interventions and instead waited for residents to initiate interventions based on their own desires. This approach enabled residents to determine the entire intervention process from planning to budget allocation and to directly carry out the interventions. Third, residents received education that encouraged them to speak up for themselves. This education did not transfer knowledge about health or interventions, but instead aimed to raise interest in the community and encourage residents to speak up about problems they encountered and possible solutions. Fourth, in addition to education, dialogue among residents to enable mutual learning by sharing their daily lives was facilitated [12,15,16].

The purpose of this study was to evaluate changes in health behaviors after HCO establishment among residents in areas of Gangwon Province that implemented the HCO.

METHODS

Data

The Korea Community Health Survey (KCHS) was conducted by the Korea Disease Control and Prevention Agency, and data were collected from adults aged 19 years or older via interviews annually from August to October. The sample was extracted from an average of 900 adults per city, county, or district (*si, gun, gu*; the unit of local government in Korea) based on the type of housing within each town, township, and neighborhood. The primary sampling unit (urban village, rural village, or hamlet) was obtained using probability proportional to size systematic sampling, after which the secondary sample families were selected [17].

This study had a before-and-after design using KCHS data from 2011 to 2019, focusing on 3-year periods before and after implementation of the HCO. The HCO began in 2013 in 2 areas, followed by 4 areas in 2014, 3 areas in 2015, 4 areas in 2016, 5 areas in 2017, and 2 areas in 2018. The main goal of the HCO was to empower residents to address health issues in their communities, but it was recognized that achieving this goal would not be a quick process. Therefore, the first year of the HCO was included in the pre-HCO period. To compare the 3 years before and after HCO implementation, a total of 4512 individuals from 11 areas where the HCO was implemented for 4 years or more were included: Bukbang-myeon in Hongcheon-gun, Miro-myeon in Samcheok-si, Gohan-eup in Jeongseon-gun, MungokSodo-dong in Taebaek-si, Nam-myeon in Hongcheon-gun, Jumunjin-eup in Gangneung-si, Jungdong-myeon in Yeongwol-gun, Cheongho-dong in Sokcho-si, Hyeonnam-myeon in Yangyang-gun, Daehwa-myeon in Pyeongchang-gun, and Gapcheon-myeon in Hoengseong-gun.

For areas where the HCO started in 2013, we designated the years 2011-2013 as “before HCO implementation” and the years 2014-2016 as “after HCO implementation.” For areas where the HCO started in 2014, we designated the years 2012-2014 as “before HCO implementation” and the years 2015-2017 as “after HCO implementation.” For areas where the HCO started in 2015 we designated the years 2013-2015 as “before HCO implementation” and the years 2016-2018 as “after HCO implementation.” For areas where the HCO started in 2016, we designated the years 2014-2016 as “before HCO implementation” and the years 2017-2019 as “after HCO implementation.”

Demographics

The demographic characteristics of the study population included sex, age, residential area type (urban, rural), household income (<2 million, ≥2 million Korean won [KRW] or more per month), education (middle school or less, high school or above), and HCO start year (2013, 2014, 2015, 2016). The residential area type was classified as urban for neighborhoods and rural for towns or townships.

Outcomes (Health Behaviors)

The main health behavior indicators from the KCHS guidelines were used as outcomes. To define the outcomes, we followed the definitions of the indicator variables as established by the KCHS guidelines [18].

Current smoking was classified as “yes” for those who had

smoked more than 5 packs (100 cigarettes) in their lifetime and currently smoked, and “no” for others. Current smokers were subdivided into those who did or did not plan to quit smoking within 1 month and according to whether they had attempted to quit smoking for 24 hours or more within the past year.

Monthly drinking was classified as “yes” for those who drank alcohol at least once a month in the past year, and “no” for those who did not. High-risk drinking was classified as consuming 7 or more drinks at once at least twice a week in the past year (5 or more drinks for female).

Walking exercise practice was classified as “yes” for those who walked for 30 minutes or more a day for at least 5 days in the past week, and “no” for those who did not. Subjective obesity recognition was classified as “yes” for those who responded that they were “slightly obese” or “very obese”, and “no” for those who did not. Attempt to control weight was classified as “yes” for those who made an effort to “lose or maintain” their weight in the past year, and “no” for those who did not.

Subjective stress recognition was classified as “yes” for those who responded as “feeling very stressed” or “feeling quite stressed” in their daily lives, and “no” for those who did not. Experience of depression was classified as “yes” for those who experienced sadness or despair that interfered with their daily lives for 2 or more consecutive weeks in the past year, and “no” for those who did not.

Statistical Analysis

This study was analyzed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). The Rao-Scott composite sample chi-square test was performed to compare the health behavior indicators before and after HCO implementation. Complex sample logistic regression analysis was conducted to examine the changes in health behavior indicators before and after HCO implementation, and complex sample multiple logistic regression analysis was conducted to adjust for demographic characteristics.

Ethics Statement

This study was deemed exempt by the Korea Disease Control and Prevention Agency Institutional Review Board because of the anonymous sample.

RESULTS

The demographic characteristics of the study population are presented in Table 1. Before the HCO (n=2205), males ac-

Table 1. Demographic characteristics of the study population before and after implementation of the health community organization

| Characteristics | Before (n=2205) | After (n=2307) |
|--|--------------------|-------------------|
| Sex | | |
| Male | 1008 (45.7) | 1070 (46.4) |
| Female | 1197 (54.3) | 1237 (53.6) |
| Age (y) | 57.4 ± 16.0 | 59.2 ± 15.8 |
| Residential area type | | |
| Urban area (<i>dong</i>) | 359 (16.3) | 379 (16.4) |
| Rural area (<i>eup/myeon</i>) | 1846 (83.7) | 1928 (83.6) |
| Household income (10 ⁴ Korean won/mo) | | |
| Low (<200) | 1189 (54.2) | 1184 (51.8) |
| High (≥200) | 1005 (45.8) | 1102 (48.2) |
| Education | | |
| Middle school or below | 1310 (59.5) | 1328 (57.7) |
| High school or over | 893 (40.5) | 975 (42.3) |
| Health community organization start year | | |
| 2013 ¹ | 155 (7.4) | 147 (7.4) |
| 2014 ² | 770 (28.5) | 909 (31.2) |
| 2015 ³ | 331 (36.7) | 328 (34.9) |
| 2016 ⁴ | 949 (27.5) | 923 (26.4) |

Values are presented as number (weighted %) or weighted mean ± standard error.

¹Bukbang-myeon in Hongcheon-gun; the years 2011-2013 were considered "before" and years 2014-2016 were considered "after."

²Miro-myeon in Samcheok-si, Gohan-eup in Jeongseon-gun, MungokSodong in Taebaek-si, Nam-myeon in Hongcheon-gun; the years 2012-2014 were considered "before" and years 2015-2017 were considered "after."

³Jumunjin-eup in Gangneung-si, Jungdong-myeon in Yeongwol-gun; the years 2013-2015 were considered "before" and years 2016-2018 were considered "after."

⁴Cheongho-dong in Sokcho-si, Hyeonnam-myeon in Yangyang-gun, Daehwa-myeon in Pyeongchang-gun, and Gapcheon-myeon in Hoengseong-gun; the years 2014-2016 were considered "before" and years 2017-2019 were considered "after."

counted for 45.7% of the population, and the average age was 57.4 years. The residential area type was predominantly rural, with 83.7%. During that period, 54.2% had a monthly household income of less than 2 million KRW, and 59.5% had a middle school education or lower. After the HCO (n=2307), males accounted for 46.4%, and the average age was 59.2 years. The residential area type was still predominantly rural, with 83.6%. During that period, 51.8% had a monthly household income of less than 2 million KRW, and 57.7% had a middle school education or lower.

The proportion of health behaviors before and after HCO implementation is presented in Table 2. After the HCO, there was a decrease in current smoking from 26.4% to 22.5% ($p=0.036$),

Table 2. The proportion of resident's health behaviors before and after implementation of the health community organization

| Health behaviors | | Before | After | <i>p</i> -value |
|--|-----|-------------|-------------|-----------------|
| Current smoking | Yes | 494 (26.4) | 462 (22.5) | 0.036 |
| | No | 1711 (73.6) | 1845 (77.5) | |
| Plan to quit smoking within 1 mo (among current smokers) | Yes | 18 (3.8) | 30 (5.2) | 0.527 |
| | No | 476 (96.2) | 432 (94.8) | |
| Attempt to quit smoking (among current smokers) | Yes | 106 (21.3) | 107 (23.1) | 0.630 |
| | No | 388 (78.7) | 355 (76.9) | |
| Monthly drinking | Yes | 1071 (55.5) | 1152 (54.9) | 0.783 |
| | No | 1134 (44.5) | 1154 (45.1) | |
| High-risk drinking | Yes | 338 (18.3) | 337 (17.9) | 0.804 |
| | No | 1867 (81.7) | 1969 (82.1) | |
| Walking exercise practice | Yes | 477 (21.6) | 648 (27.4) | 0.002 |
| | No | 1727 (78.4) | 1658 (72.6) | |
| Subjective obesity recognition | Yes | 773 (35.9) | 831 (37.8) | 0.329 |
| | No | 1431 (64.1) | 1476 (62.2) | |
| Attempt to control weight | Yes | 953 (45.0) | 1107 (50.7) | 0.017 |
| | No | 1252 (55.0) | 1199 (49.3) | |
| Subjective stress recognition | Yes | 559 (28.9) | 516 (23.7) | 0.012 |
| | No | 1646 (71.1) | 1786 (76.3) | |
| Experience of depression | Yes | 143 (5.9) | 155 (7.5) | 0.155 |
| | No | 2062 (94.1) | 2149 (92.5) | |

Values are presented as number (weighted %).

while there was an increase in the proportions of current smokers who planned to quit smoking within 1 month, from 3.8% to 5.2% ($p=0.527$), and had attempted to quit smoking, from 21.3% to 23.1% ($p=0.630$), compared to before HCO implementation. Monthly drinking and high-risk drinking also decreased from 55.5% to 54.9% ($p=0.783$) and from 18.3% to 17.9% ($p=0.804$), respectively. Additionally, walking exercise practice increased from 21.6% to 27.4% ($p=0.002$), and subjective obesity recognition increased from 35.9% to 37.8% ($p=0.329$), while the proportion of participants who had attempted to control their weight increased from 45.0% to 50.7% ($p=0.017$) after HCO implementation. However, despite the decrease in subjective stress recognition from 28.9% to 23.7% ($p=0.012$), there was an increase in the experience of depression from 5.9% to 7.5% ($p=0.155$) after HCO implementation.

Regarding changes in health behaviors before and after HCO implementation, the results of a simple logistic regression analysis and a multiple logistic regression analysis adjusted for demographic characteristics are shown in Table 3. In simple logistic regression analysis, Current smoking decreased by

Table 3. Complex sample logistic regression for changes in health behaviors after implementation of the health community organization

| Health behaviors | Categories | Unadjusted | Adjusted ¹ |
|--|------------|---------------------|-----------------------|
| Current smoking | Yes | 0.81 (0.66, 0.99)* | 0.73 (0.57, 0.95)* |
| Plan to quit smoking within 1 mo (among current smokers) | Yes | 1.37 (0.51, 3.69) | 1.38 (0.54, 3.51) |
| Attempt to quit smoking (among current smokers) | Yes | 1.11 (0.73, 1.68) | 1.14 (0.74, 1.74) |
| Lifetime drinking | Yes | 0.98 (0.82, 1.16) | 1.00 (0.83, 1.20) |
| High-risk drinking | Yes | 0.97 (0.76, 1.23) | 0.93 (0.71, 1.23) |
| Walking exercise practice | Yes | 1.37 (1.12, 1.69)** | 1.39 (1.13, 1.71)** |
| Subjective obesity recognition | Yes | 1.09 (0.92, 1.28) | 1.15 (0.96, 1.37) |
| Attempt to control weight | Yes | 1.26 (1.04, 1.52)* | 1.36 (1.12, 1.64)** |
| Subjective stress recognition | Yes | 0.76 (0.62, 0.95)* | 0.79 (0.64, 0.97)* |
| Experience of depression | Yes | 1.29 (0.90, 1.86) | 1.41 (0.97, 2.04) |

Values are presented as odds ratio (95% confidence interval).

¹Adjusted for sex, age, residential area type, household income, education, and health community organization start year.

* $p < 0.05$, ** $p < 0.01$.

0.81 times (95% confidence interval [CI], 0.66 to 0.99) after HCO implementation. Walking exercise practice and attempts to control weight increased by 1.37 times (95% CI, 1.12 to 1.69) and 1.26 times (95% CI, 1.04 to 1.52), respectively, after HCO implementation. Furthermore, subjective stress recognition decreased by 0.76 times (95% CI, 0.62 to 0.95) after HCO implementation. In multiple logistic regression analysis, current smoking decreased by 0.73 times (95% CI, 0.57 to 0.95) after HCO implementation. Additionally, walking exercise practice and attempts to control weight showed an increase of 1.39 times (95% CI, 1.13 to 1.71) and 1.36 times (95% CI, 1.12 to 1.64), respectively, after HCO implementation. Moreover, subjective stress recognition decreased by 0.79 times (95% CI, 0.64 to 0.97) after HCO implementation. There were no significant changes in other health behaviors.

DISCUSSION

This study was conducted to investigate the effects of the HCO in Gangwon Province by examining changes in health behaviors indicators after HCO implementation. The main results are summarized as follows. Even after adjusting for demographic characteristics, current smoking and subjective stress recognition decreased, while walking exercise practice and attempts to control weight increased after the implementation of the HCO.

The decrease in current smoking after HCO implementation is consistent with several previous studies [19-22]. Based on statistical data and health surveys, residents analyzed the health

problems of their communities. The health committee in areas with higher smoking rates felt the need for smoking cessation and planned smoking cessation interventions. They not only created smoke-free streets on busy roads, but also regularly conducted smoking cessation campaigns [23]. As a result, negative perceptions of smokers among residents are expected to have increased. Smokers received negative feedback on smoking and positive feedback on smoking cessation, which strengthened their efforts to quit smoking, and residents supported smoking cessation for smokers and ex-smokers, which decreased the smoking rate [22].

The observed decrease in stress recognition also coincided with the results of previous studies [24,25]. As residents participated in the HCO, they formed a sense of community among neighbors through formal and informal gatherings [25]. Residents who built relationships provided emotional support to each other, which decreased stress [26].

The increase in walking exercise practice and attempts to control weight can be attributed to various reasons. Residents of areas with high obesity rates shared similar concerns and were motivated to solve them [27]. In addition, the health committees created walking paths and planned walking festivals without the involvement of public health centers to promote a walking culture [28]. The improved pedestrian environment also had positive effects on attempts to control weight and walking exercise practice [29]. Furthermore, participating in the HCO provided opportunities for walking, since residents had to leave their homes to attend health committee meetings and other organized activities [30,31].

Some health behavior indicators did not show significant changes. There are several possible reasons for this: First, there may have been dilution of the results as individuals who did not participate in the HCO were also included in the study. Second, the sample size used in this study may have been inadequate to produce statistically significant findings.

The CBPR conceptual model provides a comprehensive framework for examining the health promotion effects of the HCO [5]. Through community organizing, the residents participated in health committees and established partnerships with each other and the community health center. They gained leadership and cooperation skills through education, and shared their concerns about local health issues. They initiated interventions such as smoking cessation campaigns and the creation of walking paths based on their own desires. As a result of implementing the interventions and subsequent reflections, a sense of community was established among the residents, and the health committees were empowered to solve problems. Moreover, the intervention positively influenced the residents' health behaviors, and the improved environment and sense of community had a positive impact on sustaining those health behaviors [32].

Subjective obesity recognition increased, although not significantly, which may have been influenced by the increasing trend of obesity rates in Korea [33]. Although stress decreased, there was no significant change in the experience of depression, which suggests a need for further research.

This study makes several contributions. First, in a context where quantitative research on the impacts of the HCO is lacking, this study sought to evaluate the effects of the HCO using a community health survey. Second, it is worth noting that the study examined a relatively extended period of the HCO to account for the potential impact of sufficient empowerment resulting from community participation. Third, the study reflects the diverse characteristics of the areas where the HCO was implemented, as it was carried out in various locations within Gangwon Province, rather than a single area.

There are several limitations that need to be considered. First, the study had an uncontrolled before-and-after design, which limits the ability to interpret the results accurately, as factors other than the HCO may have influenced the results, such as general trends. Second, to evaluate HCO at the town, township, and neighborhood level, data from 3 years of the KCHS were combined to compensate for the small sample size. However, since the KCHS samples at the city, county, and district level and is designed separately each year, the validity of

the data has limitations. Third, the community health survey used in this study included people who did not participate in the HCO, which means that the results should be interpreted as reflecting the effect of health promotion on the entire community, rather than just on the individuals who participated. Fourth, although the study conducted a before-and-after analysis with adjustment for the HCO start year in each area, the results may have been influenced by other HCOs that started earlier in different areas. Finally, the areas were not selected through probability sampling, making it difficult to generalize the research findings to the entire Gangwon Province. In the future, to analyze the effects of the HCO more accurately, structured quasi-experimental studies should be conducted. These studies should compare HCO implementation areas and control regions that are selected by probability sampling and control for differences in data collection periods.

This study explored the impact of the HCO on residents' health behaviors and revealed that the HCO had a positive influence on community health indicators. However, for a more in-depth understanding of the HCO's effects, it is essential to conduct future research comparing HCO implementation areas with control areas.

CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

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REFERENCES

1. World Health Organization. Declaration of Alma-Ata; 1978 [cited 2022 Nov 8]. Available from: <https://apps.who.int/iris/handle/10665/347879>.
2. World Health Organization. Ottawa charter for health promotion, 1986 [cited 2022 Nov 8]. Available from: <https://apps.who.int/iris/handle/10665/349652>.
3. Heo HH. A community-based participatory approach to reducing health inequalities. *Health Welf Policy Forum* 2018;260:62-77 (Korean).
4. Wallerstein N, Duran B, Oetzel JG, Minkler M. Community-based participatory research for health: advancing social and health equity. San Francisco: Jossey-Bass; 2017, p. 77-94.
5. Oetzel JG, Wallerstein N, Duran B, Sanchez-Youngman S, Nguyen T, Woo K, et al. Impact of participatory health research: a test of the community-based participatory research conceptual model. *Biomed Res Int* 2018;2018:7281405.
6. Song S, Kim HY, Heo HH. Development of a quantitative evaluation tool for Seoul's community-based participatory health program 'building healthy communities'. *Health Promot Int* 2022;37(S2):ii97-ii108.
7. Kim SR. Participation as empowerment in health promotion intervention: in-depth case study of health saemael program [dissertation]. Seoul: Seoul National University; 2019 (Korean).
8. Kim JR, Jeong BK, Park KS, Kang YS. The characteristics and changes in health behaviors and social capital of health committee members in community organizing for health: health plus happiness plus projects in Gyeongsangnam-do. *Korean J Health Educ Promot* 2017;34(2):15-28 (Korean).
9. Lee SJ, Kim KY, Lee DH, Hong NS. Participation in the Gyeongsangbuk-do health Saemael program and health behavior improvement effect. *J Health Info Stat* 2019;44(4):384-393 (Korean).
10. Busan Public Health Policy Institute. A study on effective operation plan of health promotion project by small living area unit. Busan: Busan Public Health Policy Institute; 2020 (Korean).
11. Lee DY, Kim CO, Lee YH, Choi M, Hwang M, Heo HH, et al. The fruits and the limitations of Seoul's community-based participatory health program of "building healthy communities". *Health Soc Welf Rev* 2022;42(1):316-334 (Korean).
12. Gangwon-do Integrated Health Promotion Project Group. Guidelines for Gangwon's Health-Plus community program. Chuncheon: Gangwon Provincial Government; 2019 (Korean).
13. Korea Community Organization Network for Education & Training. Community organizing methodology. Seoul: JeJungGu Memorial Project; 2010, p.13-40 (Korean).
14. Minkler M. Community organizing and community building for health and welfare. 3rd ed. New Brunswick: Rutgers University Press; 2012, p. 37-52.
15. Gyeongsangbuk-do Integrated Health Promotion Project Group. The white paper for community-based participatory health project. Andong: Gyeongbuk Provincial Government; 2019 (Korean).
16. Jeong BG, Kim JR, Kang YS, Park KS, Lee JH, Jo SR, et al. The strategies to address regional health inequalities in Gyeongsangnam-do: Health Plus Happiness Plus projects. *J Agric Med Community Health* 2012;37(1):36-51 (Korean).
17. Kim YT, Choi BY, Lee KO, Kim H, Chun JH, Kim SY, et al. Overview of Korean Community Health Survey. *J Korean Med Assoc* 2012;55(1):74-83 (Korean).
18. Korea Disease Control and Prevention Agency. Community health survey operational guide. Cheongju: Korea Disease Control and Prevention Agency; 2020 (Korean).
19. Fisher EB, Auslander WF, Munro JF, Arfken CL, Brownson RC, Owens NW. Neighbors for a smoke free north side: evaluation of a community organization approach to promoting smoking cessation among African Americans. *Am J Public Health* 1998; 88(11):1658-1663.
20. Fries EA, Ripley JS, Figueiredo MI, Thompson B. Can community organization strategies be used to implement smoking and dietary changes in a rural manufacturing work site? *J Rural Health* 1999;15(4):413-420.
21. Plescia M, Herrick H, Chavis L. Improving health behaviors in an African American community: the Charlotte Racial and Ethnic Approaches to Community Health project. *Am J Public Health* 2008;98(9):1678-1684.
22. Secker-Walker RH, Flynn BS, Solomon LJ, Skelly JM, Dorwaldt AL, Ashikaga T. Helping women quit smoking: results of a community intervention program. *Am J Public Health* 2000; 90(6):940-946.
23. Kim MY, Kim EY, Hwang JO. Resident-led health plus project in Sodo-dong, Taebaek-si, Gangwon-do. *Mon Community Health*

- Rep 2019;29(3):12-13 (Korean).
24. Bolton M, Moore I, Ferreira A, Day C, Bolton D. Community organizing and community health: piloting an innovative approach to community engagement applied to an early intervention project in south London. *J Public Health (Oxf)* 2016; 38(1):115-121.
 25. Ding N, Berry HL, O'Brien LV. One-year reciprocal relationship between community participation and mental wellbeing in Australia: a panel analysis. *Soc Sci Med* 2015;128:246-254.
 26. Rock A, Barrington C, Abdoulayi S, Tsoka M, Mvula P, Handa S. Social networks, social participation, and health among youth living in extreme poverty in rural Malawi. *Soc Sci Med* 2016; 170:55-62.
 27. Lin SC, Chen IJ, Yu WR, Lee SD, Tsai TI. Effect of a community-based participatory health literacy program on health behaviors and health empowerment among community-dwelling older adults: a quasi-experimental study. *Geriatr Nurs* 2019; 40(5):494-501.
 28. Kim SS, Choi BG, Jo IS, Lee KY. Can residents themselves change the health indicators of their community? *Mon Community Health Rep* 2018;23(9):16-17 (Korean).
 29. Owen N, Cerin E, Leslie E, duToit L, Coffee N, Frank LD, et al. Neighborhood walkability and the walking behavior of Australian adults. *Am J Prev Med* 2007;33(5):387-395.
 30. Ihara S, Ide K, Kanamori S, Tsuji T, Kondo K, Iizuka G. Social participation and change in walking time among older adults: a 3-year longitudinal study from the JAGES. *BMC Geriatr* 2022; 22(1):238.
 31. Nemoto Y, Sato S, Kitabatake Y, Nakamura M, Takeda N, Maruo K, et al. Longitudinal associations of social group engagement with physical activity among Japanese older adults. *Arch Gerontol Geriatr* 2021;92:104259.
 32. Kanamori S, Takamiya T, Inoue S, Kai Y, Kawachi I, Kondo K. Exercising alone versus with others and associations with subjective health status in older Japanese: the JAGES Cohort Study. *Sci Rep* 2016;6:39151.
 33. Korea Disease Control and Prevention Agency. Korea health statistics 2021: Korea National Health and Nutrition Examination Survey (KNHANES VIII-3). Cheongju: Korea Disease Control and Prevention Agency; 2021 (Korean).