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Towards Universal Health Coverage: Designing a Community Based Intervention to Scale Up Coverage with Health Insurance, in A-Duiem Administrative Unit, Sudan 2018-2019

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ABSTRACT

Background: Community engagement has proved effective in increasing access to healthcare including health insurance, in developed and developing countries.
Aim: The study aims at designing and testing the effectiveness of engaging the community in awareness-raising and increment of health insurance coverage.
Methods: The study was a social interventional community-based study, conducted in A-Duiem Administrative Unit, A-Duiem Locality, Sudan. Baseline data on enrollment in health insurance was collected from 800 heads of households, whereas data on knowledge and attitudes about health insurance was collected from 420 heads of non-insured households using a standardized questionnaire. Strategies to scaleup health insurance through community engagement was collected from community leaders, local authorities, and health insurance policymakers through in-depth interviews and focus group discussions. The community promotion package of health insurance was implemented for one year and post-intervention data were collected from 420 heads of households. Quantitative data were analyzed using SPSS version 20. Statistical significance was set at $p<0.05$ when the confidence interval was 95%. Qualitative data was analyzed manually using the thematic approach.
Results: The study showed significant improvement in the knowledge of the heads of the non-insured households about health insurance after the intervention; knowledge about the enrollment process and service's package has increased from 34.4% to 61.8% and from 55.8% to 84.7% respectively (p-value 0.0001 in both). The health insurance coverage increased by 17.3% with a significant difference and p-value at 0.0001.
Conclusion: The study concluded that community members have a considerable role in awareness-raising and scaling up of health insurance coverage if they are properly organized, trained, monitored, and supervised. The insufficient commitment of local officials in the unit was a challenge to address during further testing and expansion of the experience.

Keywords
Health insurance; Population coverage; Knowledge; Attitudes; Community engagement; Intervention; Sudan.

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BACKGROUND

Universal Health Coverage (UHC) is the aspiration that all people can obtain the quality health services they need (equity in service use) without fear of financial hardship (financial protection).[1]

Community engagement in the health context is the involvement of the community members in attaining UHC. It also requisites involving community members in developing and implementing policies that will affect them as health consumers. It has proved effective in addressing different health issues, including health insurance (HI) in developed and developing countries,[2,3] such as Rwanda and Thailand.[4,5] It worth adopting it in resource constraint countries.[6]

In Sudan, community engagement has been translated through the construction of health facilities, the top-up of health personnel and the conduction of health education campaigns. Khartoum State; was an inspiring experience, where HI coverage has remarkably increased to 72.2% in 2017,[7] through an intensive community engagement. Others included the White Hands Initiative which mobilizes funds from Zakat, national charity institutions, and community activists to pay HI premium for the poor. Similar successful stories were seen in Gezira State and White Nile State.[8]

Awareness-raising is crucial for the acceleration of HI coverage. Yet, many studies showed low-levels of awareness among populations. Awareness among the community was poor at 13% in a study in Nigeria, including the general principles of community health insurance.[9]

The White Nile State is one of the States with low HI coverage. In mid-2017 it ranked as the 12th of 18 states in Sudan with a coverage rate of 46.9%.[10] This estimate was far less than the national target of 80% set in the strategic plans of the National Health Insurance Fund (NHIF) and the National Health Sector Strategic Plan which aim to achieve universal health coverage by 2019.[11,12]

Among the most important priorities of the strategic plan of the NHIF for the years 2017-2020 are to develop and diversify the mechanisms to provide HI services for the informal and private sectors, to find sufficient funding to cover the poor, and to increase awareness about the importance of HI.[11]

The study question was whether community engagement will contribute to awareness-raising and HI coverage increment in A-Duiem Administrative Unit (DAU)? The study hypothesis was that community members and community organizations could have a role in awareness-raising and HI coverage increment if they are organized, trained, monitored, and adequately supervised. The study aimed at designing and testing the effectiveness of community engagement in awareness-raising and health insurance coverage increment in DAU, A Duiem Locality and White Nile State 2018-2019. Specifically, the study aimed at exploring the perception and preferences of key stakeholders and civil society to community mobilization for HI enrollment; identifying the key stakeholders and civil society expected roles and modalities of engagement; and testing the preferred approaches of community mobilization for HI, through measuring the change in knowledge and attitudes of the target non-insured household' heads and to measure the alteration in the population coverage with HI.

MATERIALS AND METHODS

Study Design and Area

The study was an interventional community-based study that combined quantitative and qualitative techniques for the pre-intervention data collection and a quantitative one for the post-intervention phase. The study was conducted in DAU, which lies in central Sudan and composed of 34 Popular Administrative Units (Hai), 11,681 households which were resident by about 76,000 inhabitants.[13]

Study Population

The study population for the pre-intervention phase included heads of the households (HHs) with a subset of the heads of the non-insured households (HNIHs); community leaders; and members of the community organization in DAU, political and executive leaders at the locality, and decision-makers at all levels of the NHIF, while only the HHs were addressed in the post intervention phase.

Sample Size and Sampling

Eight-hundred (800) HHs among them four hundred and twenty (420) HNIHs were enrolled in the study. A cluster sampling technique was used where the cluster is the Hai. Details of the sample size formula and selection process were depicted in the paper "*Determinants of Non-Insurance in A-Duiem Administrative Unit, White Nile State, Sudan 2018*".[14] The same method was used during the post-intervention phase, but the sample included all HHs whether insured or not. Other study populations were selected purposively[15] based on their proactive role, acceptability by the community, and representation of community organizations. They included seven policymakers from the NHIF at different levels; thirteen local political and executive leaders at the locality and the administrative unit; thirteen traditional community and community-based organizations leaders, including women and youth; and eighty members from the community-based organizations and the community at the administrative unit.

Data Collection

Six data collection tools were developed and tested by the research team. Data collection tools for the HHs, HNIHs, Community leaders, and members of the community organizations were described in details in the paper "*Determinants of Non-Insurance in A-Duiem Administrative Unit, White Nile State, Sudan 2018*".[14] The fifth tool was used to collect data from officials at the NHIF

through face-to-face interviews. The sixth one was used during the post-intervention phase to collect quantitative data through face-to-face interviews with HHs. It was a modified version from the pre-intervention one. The data collectors were qualified personnel from DAU who were trained and supervised during the fieldwork by three experts.

Variables

The quantitative variables for HHs were only their status of insurance and for the HNIHs were their knowledge about and attitudes towards HI.

The qualitative variables for the other study populations included their views about experiences of community engagement in HI, methods of organization of the community engagement in HI, tasks which could be performed, entities that could be engaged in awareness-raising and HI coverage increment, the suggested support from the NHIF to the community work, and the suggested methods for monitoring and supervision of the community work.

Data Analysis

Data were cleaned and analyzed manually for HI coverage during the pre-intervention phase and by SPSS version 20 for other quantitative variables.

The study team agreed on three key indicators to assess the level of knowledge; including the process of enrollment into HI, service package offered by HI, and HI premium. The results were qualified as good, moderate, poor, or did not know when the interviewee knew the three, two, one, or zero of the specified indicators respectively.

Descriptive statistics were carried out for quantitative data and inputs were summarized as frequencies and proportions using a 95% confidence level.

Inferential statistics using chi-square were used to test the difference in HI status, knowledge, and attitude of HNIHs towards HI before and after the intervention. A probability value of less than 0.05 was considered statistically significant.

Qualitative data were revised immediately after collection, transcribed, ordered, coded, summarized, and manually analyzed by a qualified qualitative data specialist using the thematic approach. The outcomes were presented in terms of texts.

The Intervention

The study team designed the intervention based on the information derived from the pre-intervention survey.

Almost all HI officials agreed that the community have a great role to promote HI, citing several experiences in Sudan such as Khartoum, Gezira, Northern, and the White Nile States, and the White Hands Initiative as well as worldwide such as Rwanda, Ghana, and Ethiopia. Eighty-nine percent (89%) of the HNIH confirmed that the community could have a considerable role in HI awareness-raising and coverage increment.

Almost all the study participants from DAU were inspired by the community initiatives and solidarity in developmental interventions in the unit and therefore they believe that the promotion of the HI among the community can follow the same tracks.

Regarding mobilization and organization of the community, most of the HI officials suggested the establishment of community committees at different levels in DAU with clearly identified tasks and relationships and with contribution from the HI as a rapporteur. Almost all the participants from the locality and administrative unit have proposed the establishment of an executive community committee at the administrative unit including stakeholders assisted by sub-committees at the Hai level (residential settings). Most of them emphasized the importance of the subcommittees, indicating that their role is essential in facilitating entry to the community at the Hai level. Based on that, the intervention included the establishment of a community committee at the level of the unit and subcommittees at the level of Hais.

Most of the study participants enumerated the main tasks for the committees as increasing community awareness about HI, performing the households' inventory, assisting in the process of enrollment of the non-insured in HI, and attracting financial resources to pay the premiums of the poor. Besides, a minority of the participants added the importance of monitoring the quality of the health services and participation in their improvement. Because of these suggestions the study team specified the terms of reference, tasks, powers, and relations for the committees.

Different community-based organizations and activists joined the project, in the form of community mobilization and contribution to establish the proposed community structure, which was called A-Duiem Administrative Unit Community Committee (DAUCC).

Members of DAUCC were trained by the study team about planning, HI, and community engagement in HI. After training they set and approved the unit plan, based on the structure and guidelines provided by the study team. They divided the administrative unit into six geographical sectors and assigned a supervisor for each one.

The Hai committees were formed through free selection in general meetings held for the people at each Hai and supervised by the members of DAUCC. The members of Hais' committees were trained in two-days workshops, using a manual designed by the study team. The training included theoretical and practical sessions about HI, community engagement in HI, surveying, planning, implementation, fundraising, and monitoring.

As for the support which the HI directorate could pro-

vide to the community committees, most of the participants mentioned training of the community committees, provision of educational materials for awareness-raising, participation in awareness campaigns and limited participation in transport and financial support to conduct the activities. However, few suggested providing the place for the committees and financial incentives for the volunteers.

Almost all the study participants indicated that monitoring and supervision of the community work could be through regular reports and meetings. Some study participants suggested social media such as WhatsApp and others to engage and communicate with expatriates. The monitoring of the community work was decided to be through regular reports and joint meetings between DAUCC and the study team. The monitoring tools included forms for the reports to summarize the performance of DAUCC, sectors, and Hai committees. Also, a WhatsApp group was created for continuous communication.

The implementation of the intervention continued for one year. The follow-up of the work by the official authorities, including local HI, was very weak. Some of the Hais' committees performed very well, whereas others were inactive, and their work was not as was expected to their great enthusiasm during the training sessions. There was great dropout among the members and some of them requested financial incentives. However, for those who performed well, their interventions were directly impacted on the improvement of the Hais' insurance status. The meetings of DAUCC and Hais' committees were irregular.

RESULTS

Ninety-nine percent (99%) of household's participants have responded in pre- and post-intervention surveys. Regarding the other study populations, almost all of them responded both in the interviews and the focus group discussions (FGDs).

The percentage of the non-insured families who stated that they had heard of HI increased from 63.1 to 98.6% after the intervention. The knowledge enrollment process in HI and the services provided by it increased from 34.4 to 61.8% and from 55.8 to 84.7% respectively. The difference was statistically significant

Table 1. *Knowledge of NIHH bout HI before the Intervention (2018) and after the Intervention (2019) in DAU,White State, Sudan*

Knowledge	Before Intervention (n=419)		After Intervention (n=144)		*p*-value
	N	%	N	%	
How to be enrolled in HI	144	34.4%	89	61.8%	0.0001
Services provided by HI	234	55.8%	122	84.7%	0.0001
Family premium per year	17	4.1%	6	4.2%	0.958

Table 2. *Insurance Status of the HH in DAU before the Intervention (2018) and after the Intervention (2019)*

S.No.	Hai Name	Pre-Intervention		Post-Intervention		*p*-value
		Insured HHs (%)	Total HHs	Insured HHs (%)	Total HHs	
1	1st Hai	29 (59.2)	49	16 (80)	20	0.102
2	4th Hai	42 (67.7)	62	17 (85)	20	0.134
3	7th Hai	28 (58.3)	48	14 (70)	20	0.369
4	10th Hai	23 (53.5)	43	13 (65)	20	0.394
5	Hai Elumaraa	20 (50)	40	9 (45)	20	0.717
6	West Unity and Unity Hai	19 (48.7)	39	12 (60)	20	0.415
7	The 13th Hai, Sq.1	44 (68.7)	64	17 (85)	20	0.156
8	The 13th Hai, Sq.3	29 (59.2)	49	16 (80)	20	0.102
9	The 14th Hai, Mabrouka	4 (16.7)	24	14 (70)	20	0.0004
10	The 16th Hai, AbuGabraSq.5 and Elshigla	27 (40.3)	67	24 (60)	20	0.049
11	The 16th Hai, AbuGabraSq.6	15 (42.8)	35	16 (80)	20	0.008
12	The 16th Hai, AbuGabraSq.10	4 (16.7)	24	11 (55)	20	0.008
13	The 16th Hai, AbuGabra Sq. (13-14-15-7)	21 (51.2)	41	12 (63.2)	19	0.888
14	The 17th Hai, Alrabaa	14 (41.2)	39	13 (65)	20	0.086
15	The 18th Hai, Hai AlArab and Salim	20 (50)	40	10 (50)	20	1
16	The 19th Hai, AlDaraga	0 (0)	19	12 (60)	20	0.0001
17	The 20th Hai, AlSalam	4 (16.7)	24	12 (60)	20	0.003
18	The 21st Hai, ElEngaz	11 (52.4)	31	7 (35)	20	0.228
19	The 23rd Hai, ElTadamon and Eleshlag	21 (51.2)	41	17 (85)	20	0.011
20	The 24th Hai, Awaad	6 (23)	26	10 (50)	20	0.059
	Total	381 (47.6)	800	272 (64.9)	419	0.0001

(*p*-values were 0.0001 in both cases). On the other hand, knowledge about yearly family premium did not increase, as it was 4.1% before and 4.2% after the intervention (Table 1).

There was no great change in the attitude of the NIHHs towards HI as measured by the desire to be enrolled in it, as itwas high in both cases; 97% and 97.8% before and after the intervention respectively.

The percentage of HI coverage in the administrative unit increased by 17.3% (from 47.6 to 64.9%) after the intervention and there was a statistically significant difference as the *p*-value was 0.0001. The average of the coverage increment was more than 30% and it was statistically significant after the interventions in six Hais as *p*-values were 0.0004, 0.049, 0.008, 0.008, 0.0001 and 0.003 in Mabrouka, Abu Gabra Sq. 5 and El Shigla, Abu Gabra Sq. 6, Abu Gabra Sq. 10, Al Daraga, and Al Salam respectively as shown in Table 2.

DISCUSSION AND CONCLUSION

The expectations of almost all the study participants about the possibility of a successful community engagement in awareness-raising and HI coverage increment is not strange for the Sudanese people as they see it as a religious matter in the first place "*a believer for a believer is like a building pulling together*" said prophet Mohamed peace be upon him.[16] It also corresponds to what has been proven by studies in many developed and developing countries, which indicated that community participation has high effectiveness in addressing various health issues, including HI. Examples included the role of the community in HI and UHC in South Africa, Rwanda, Thailand, and other countries.[2,3,5]

In Sudan, too, there was a broad community participation on all issues, including health, ranging from building health facilities, motivating health workers, and conducting health convoys. There were also several experiences of community participation in HI, such as the experience of the White Hands Initiative, which aims at involving Zakat, institutions, and individuals in paying the insurance premium for the poor.[17] Together with the different HI initiatives of the community in Khartoum, Gezira and Sennar states.[18,19]

Most of the methods for organizing the community and its tasks, mentioned by the study participants, were also performed by the HI community committees in the Khartoum State.[18] Fundraising as a task suggested for the committees was used to be carried out by most of the communities engaged in HI in Sudan. As mentioned above, the non-governmental community organization "*White Hands Initiative*" was created in Sudan specifically to raise fund to pay the HI premium of the poor.[17]

In the intervention period some committees and some members performed very well, this was also noticed in Rwanda, where there was a good performance. This good performance in Rwanda was due to the good leadership and high commitment, strong and real desire to work, attention to defining and describing tasks accurately, training and raising competencies.[4] Most of these factors were also available in this experience. Yet other important factors that were not available in this intervention, and they were also similar to the experience in Rwanda include coordination and cooperation and methods of solving the problems.[4] The literature also shows that for the community work to be successful, people who want to volunteer must have several traits, including the true desire to volunteer, complete willingness to exert effort; money; and time, impartiality and selflessness, honesty and sincerity, activity, sincerity and dedication, the ability to work with the team and the ability to coordinate with the relevant authorities, to demonstrate high ethics in dealing with others and not to seek success in the failure of others.[3] In this experience, despite the availability of traits in some committee members, many of them lacked traits such as willingness to exert effort; money; and time, dedication, and ability to coordinate. Similar challenges to the work were also found in several experiences such as the inability to continue voluntary work, multiple individual obligations, and the lack of follow-up, encouragement, and direction by the administrative authorities.[3]

The weakness of the local authority's follow-up for the community work has greatly affected its success. This was also noticed in an interventional study conducted in Ghana about the design and implementation of community engagement interventions towards healthcare quality improvement. The study, which was published in 2016, indicated that if the community engagement in the healthcare process is not well-supervised and monitored, the intervention will not provide the desired outcomes.[6]

The significant improvement in the knowledge of the NIHH about HI after the intervention was expected, as the members of the community committees shared the knowledge which they received during the training with their families and neighbors and within their Hais. It was also noticed that during the intervention period some community activities were performed for awareness-raising about HI, among that was a campaign performed for secondary schools' students.

The minor change noticed about the attitudes of NIHH toward HI and their desire to be ensured was because even before the intervention their attitude was excellent and nearly all of them had the desire to be ensured. This was also seen in Nigeria, where the respondents to the study showed a positive attitude towards HI and 97% of them expressed their interest in participating and enrolling themselves in HI.[9]

The change in the population coverage with HI after the intervention which was statistically significant is considerably high compared to other areas in Sudan (17.3%). For example, when comparing it with the annual change in the percentages of HI in A-Duiem locality, the White Nile State and the national level at the end of the years 2017, 2018 and 2019, which were -0.3%, 10% and 11.6%, respectively in A-Duiem, 0%, 11.4%, and 13% respectively in the White Nile State, while at the national level, it was 12%, 10.1%, and 11.9%, respectively.[7] Before 2015, the annual percentages changes in Sudan were even lower, as they were 3.5%, 1.5%, 4.6% and 3% between the years 2011 to 2015.[19]

Several studies and reports supports that this increase is due to the community engagement in HI, including what happened in Khartoum State when a great increase occurred in the HI coverage and the State ranked the first among the states of Sudan.[7] That was happened after the implementation of the comprehensive HI coverage project, with the participation of the community committees.[18] In Rwanda the HI coverage increased from 9 to 90% in 9-years from 2003 to 2012 due to the active participation of the community.[4] Another evidence was also seen in a study conducted in Ghana to evaluate the impact of community engagement on healthcare utilization and health insurance enrolment. It was found that in a short period (12-months) the intervention resulted in a 7.2% point increase in the HI enrolment of the members in the intervention communities who were uninsured at baseline.[20] Similarly the effectiveness of the community engagement in public health interventions was found to have a positive impact on the health outcomes of the disadvantage groups in a meta-analysis study which included 131 studies.[21]

In conclusion, the study demonstrated that community members and community organizations could have a major role in awareness-raising and HI coverage increment, if they were organized, trained, monitored, and supervised properly. This was apparent from the significant change in knowledge about HI and the increase in population coverage with HI after the intervention. The study produced several documents that could be used by the concerned to ensure effective community involvement in HI, such as committees' formation documents, the training manual for the committee members, the inventory and classification forms and the report forms.

LIMITATIONS OF THE STUDY

One of its limitations was that it relied on data before and after the intervention and did not include another geographical area for comparison. The intervention period continued for only one year due to the limited available time and budget. The best for such studies is to continue for a longer time to test the continuity of the intervention.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical and administrative approvals were obtained from the Ministry of Health in the White Nile State and DAU respectively and oral informed consent was obtained from the study population according to the guidelines of the National Health Research Ethics Committee.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. Universal Health Coverage: Lessons to Guide Country Actions on Health Financing. Web site. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2412876. Accessed November 14, 2020.

2. Setswe GWJ. Community engagement in the introduction and implementation of the National Health Insurance in South Africa. *J Public Heal Africa.* 2013; 4(1): e6. doi: 10.4081/jphia.2013.e6

3. N C. Community Participation: What Is It? Transitions: Community Participation. Web site. http.://www.advocatesforyouth.org/publications/683-community. Accessed November 15, 2017.

4. Kunda T, Ndizeye C, Saya U, Nyinawankunsi J. Increasing equity among community-based health insurance members in Rwanda. African Health Monitor (20). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5345425/. Published 2015. Accessed November 16, 2017.

5. Centre for Global Development. Health Access for All: Thailand's Universal Coverage Scheme. Web site. http://millionssaved.cgdev.org/case-studies/thailands-universal-coverage-scheme. Accessed 22 November 2017.

6. Alhassan RK, Nketiah-Amponsah E, Arhinful DK. Design and implementation of community engagement interventions towards healthcare quality improvement in Ghana: A methodological approach. *Health Econ Rev.* 2016; 6(1): 49. doi: 10.1186/s13561-016-0128-0

7. National Health Insurance Fund. Percentages of Health Insurance Coverage in Sudan (Available in Arabic). Khartoum; 2019.

8. National Health Insurance Fund.The Comprehensive Report of the National Health Insurance Fund Performance for the Year 2016, in the: Papers of the 29th Meeting of the Executive Managers. In: Khartoum; 2016.

9. Adedeji AS, Doyin A, Kayode OG, Ayodele AA. Knowledge, practice and willingness to participate in community health insurance scheme among households in Nigerian Capital City. *Sudan J Med Sci*. 2017; 12(1): 9. doi: 10.18502/sjms.v12i1.854

10. National Health Insurance Fund. Mid-Year Report of the National Health Insurance Fund for the Year 2017 (Available in Arabic). Khartoum; 2017.

11. National Health Insurance Fund. The Most Important Priorities of the Strategic Plan of the National Health Insurance Fund 2017-2020 (Available in Arabic). 2017. Web site. http://nhif.gov.sd. Accessed November 15, 2017.

12. Federal Ministry of Health, Sudan. Web site. http://fmoh.gov.sd/index.php/files/index/93. Accessed November 14, 2020.

13. Executive Manager of ADuiem Adminstrative Unit. Table of ADuiem Popular Adminstrative Units and Population (Available in Arabic). ADuiem; 2017.

14. Habbani SYI, Karaig EBA, Malik EM. Determinants of non-insurance in A-Duiem Administrative Unit. *Public Heal Open J*. 2018; 5(3): 42. doi: 10.17140/PHOJ-5-147

15. Research Methodology, Purposive Sampling. https://research-methodology.net/sampling-in-primary-data-collection/purposive-sampling/. Accessed November 16, 2017.

16. Bin Baz. Judging Hadith "the believer to the believer is like the building." Web site. https://binbaz.org.sa/fatwas/18969/ Judging Hadith-Muslim to Muslim is like the building. Accessed December 12, 2019.

17. The White Hands Initiative. Statute. 2017; Sudan.

18. Khartoum State, Health Insurance Corporation D of UC and the ES. The Project of the Universal Population Coverage in Khartoum State (Available in Arabic). Khartoum; 2016.

19. National Health Insurance Fund. Report of the Exploratory Study about Causes of Dropout from Health Insurance in Sennar State, Sudan: In The Proceedings of the Twenty Nine Meeting of the Executive Managers of Health Insurance in Sudan (Available in Arabic). Khartoum; 2016.

20. Duku SKO, Nketiah-Amponsahd E, Fenenga CJ, Arhinful DK, Janssens W, Pradhan M. The Effect of Community Engagement on Healthcare Utilization and Health Insurance Enrolment in Ghana: Results from a Randomized Experiment. Web site. http://hdl.handle.net/10419/177707www.econstor.eu. Accessed March 27, 2021.

21. O'Mara-Eves A, Brunton G, Oliver S, Kavanagh J, Jamal F, Thomas J. The effectiveness of community engagement in public health interventions for disadvantaged groups: A meta-analysis. *BMC Public Health*. 2015; 15(1): 129. doi: 10.1186/s12889-015-1352-y