PUBLIC HEALTH RESEARCH

Training is an Important Factor for Community Health Workers in Performing KOSPEN Health Screening Activities in Malaysia: Community Health Workers (KOSPEN) 2016

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ABSTRACT

Introduction	Community health workers/volunteers (CHW) are health workers who are trained but do not possess a formal professional certificate. They are members of the community who live and work in that particular community. This study aimed to determine factors associated with not performing health screening activities by volunteers under KOSPEN; a community-based intervention programme, initiated by Ministry of Health Malaysia in October 2013.
Methods	Data from the "Evaluation of the implementation of KOSPEN programme in Malaysia 2016" was used,a cross-sectional study which was carried out in randomly selected KOSPEN localities throughout Malaysia. The response rate was 94.9%. A pre-tested, self-administered questionnaire was used. Descriptive statistics andlogistic regression analysis was applied using Statistical Package for Social Sciences (SPSS) version 20.
Results	700 volunteers were included in this study. Majority were female (65.7%), aged 50-59 years (30.9%), had secondary education (65.3%), employed (55.7%.) and married (80.4%). Several issues were identified by the volunteers; funding (47.2%), module content and comprehensibility (11.4% respectively), submitting returns (17%). Multivariate logistic regression showed that volunteers who never attended training (aOR 2.79; 95% CI:1.66, 4.67) and who felt the content of the training module was inadequate (aOR 2.693; 95% CI: 1.46, 4.98) were more likely did not perform screening activities in the community.
Conclusions	Volunteers who were not trained and those who felt the content of the training module was inadequate did not carry out screening activities. These findings will be useful for stakeholders to make improvements to the programme for a more successful implementation.
Keywords	KOSPEN - community health workers - NCD screening - community - based intervention

Article history:
Received: 23 March 2021
Accepted: 25 June 2021
Published: 1 September 2021

INTRODUCTION

The World Health Organization (WHO) reported that, major non-communicable diseases (NCD) which include cardiovascular diseases, cancer, diabetes and chronic respiratory diseases account for almost 80% of all deaths in the Western Pacific Region and also 50% of all premature mortality (under 70 years) in low and middle income countries in the region.[1] Modifiable behaviours, such as tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol, all increase the risk of NCDs.[2] The WHO in their global action plan to combat NCDs have asked to incorporate the prevention and control of noncommunicable diseases in the training of all health personnel including community health workers, social workers, professional and non-professional (technical, vocational) staff, with an emphasis on primary health care.[3]

Community health workers (CHW) or community health volunteers are as health workers who have been trained to some extent but do not possess a formal professional certificate, many live and work in the community. It encompasses a wide range of health workers, paid and unpaid, professional and lay, experienced and inexperienced, including traditional birth attendants, village health workers, peer supporters, community volunteers and health extension workers.[3]

Various studies around the world have pointed towards engaging community health workers or volunteers in addressing the ever-rising threat of NCDs in the community. In a study done in Northern Mexico on a community health worker intervention programme, there were significant decreases from baseline readings of body mass index (BMI), waist circumference, hip circumference, weight, glucose and cholesterol levels.[4]

A systematic review from Nigeria concluded that CHWs have the potential to improve knowledge, health behaviour and health outcomes related to prevention and management of type 2 diabetes (T2DM) in low and middle income countries (LMIC).[5, 6] Positive outcomes were reported in 7 of 10 studies. These outcomes included increased knowledge of T2DM symptoms and prevention measures; increased adoption of treatment-seeking and prevention measures; increased medication adherence; and improved fasting blood sugar, glycated hemoglobin, and BMI.[5]

The Global Action Plan for the Prevention and Control of NCDs in Malaysia has several targets put place in the mission to reduce the burden of NCDs.[3,7] In order to achieve these NCD targets, the Ministry of Health Malaysia had initiated a community-based intervention programme, known as Healthy Community Empowers the Nation or 'Komuniti Sihat Pembina Negara' (KOSPEN) in October 2013. This intervention programme is a collaborative initiative by the Ministry of Health (MOH) with other government ministries and agencies such as the Department of Community Development (KEMAS) and the Community Watch (Rukun Tetangga or RT) under the Department of National Unity and Integration (JPNIN) which established the KOSPEN-KEMAS and KOSPEN-RT. The main scopes of KOSPEN include healthy eating, active lifestyle, body weight management, no smoking as well as early detection of NCD risk factors through early screening. The core functioning unit for KOSPEN activities are the KOSPEN volunteers or better known as *Pasukan Gerak Sihat Malaysia (GSiM)*. The main role of the KOSPEN volunteers is to conduct NCD risk factor screening in the community which include height and weight, BMI, abdominal circumference, blood glucose levels and blood pressure measurements. They were also required to demonstrate healthy cooking ways, encourage people to walk 10,000 steps per day and declare smoke free areas.[8]

However, a study done in in Malaysia reported that non-participation of the community in health screening activities conducted by the KOSPEN volunteers was 75%.[9] Taking into account all of these factors, this study was initiated to determine the factors associated with not performing health screening activities by KOSPEN volunteers.

METHODOLOGY

Data used for this study was obtained from the "Evaluation of the implementation of KOSPEN programme in Malaysia 2016", a cross-sectional study which was carried out in randomly selected KOSPEN localities throughout Malaysia from May to June 2016. The target population of this study were the KOSPEN volunteers under the KOSPEN programme in those selected localities. The KOSPEN volunteers were selected based on a few criteria such as preparedness to serve on a voluntary basis, commitment to become a volunteer, aged 18 years old and above, able to read and write, permanent resident of the community served, independent of any political, religious, or personal gains and have an interest in health care. Those who selected were required to undergo 2 days of training based on the KOSPEN training module from the Ministry of Health. A total of 103 localities which had implemented KOSPEN before 01 July 2015 were included in this study. Sample size was calculated using a single proportion formula for estimated prevalence. After adjusting for finite population, design effect and a non-response rate of 20%, the optimum sample size required was 762. Therefore, the response rate obtained was 94.9%.

Data collection was done from May to June 2016. The tool used for this study was a pre-tested, self-administered questionnaire which was made available in dual languages (English and Malay).

The questionnaire included components such as socio-demographic characteristics of the volunteers, awareness of their functions and roles, training, KOSPEN activity implementation, acceptance, and other related problems of the programme. Research assistants were trained to carry out the data collection. Written consent was obtained from all respondents who agreed to answer the questionnaire. The questionnaire was then given to the respondents to be answered on their own. The questionnaires were then collected and sent to the main office for data entry. Answers from the questionnaires were transferred to OMR forms and data was keyed in using SPSS software.

Ethical approval was obtained from Medical Research and Ethics Committee, Ministry of Health Malaysia (NMRR-16-524-30085). Factors associated with not performing health screening activities were based on the perception of the volunteers regarding several components such a management, training and monitoring. Management barriers include management of educational materials, funding, human resources and screening equipment. Training barriers include content and comprehensibility of the training module. Monitoring barriers include user friendliness of the health screening returns and the frequency of submitting returns (burdensome/not burdensome).

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics was used to illustrate the socio-demographic characteristics of the volunteers. 'Prevalence' was used to demonstrate the barriers in conducting health screening activities in the KOSPEN programme. Multiple logistic regression analysis was applied to determine factors associated with not performing KOSPEN screening activities by the volunteers. Univariate analysis (Simple logistic regression) was carried out by testing all the 14 potential predictor variables to screen for important independent variables. The variables with *p*-values <0.25 from univariate analysis (such as attend training, education material, screening equipment, content of training, comprehensibility of training, screening return and frequency return) were included in the preliminary final model for variable selection. Backward LR method was applied during variable selection. The variable selection is the process of "reducing the model" to get the best fit model by including all the candidate variables in the model and repeatedly removing the variables with the highest non-significant p-value until the model contains only significant terms. Hence, the final model was created based on two variables significantly associated at the level of $p < 0.05$ during the final steps of variables selection. Those variables were attended training and content of training. Multicollinearity and interaction were checked accordingly. The overall fitness was checked using a Hosmer Lameshow test, classification table and ROC (receiver operating characteristic) curve. The findings were presented as crude and adjusted odds ratios with their 95% confidence intervals.

RESULTS

A total of 700 volunteers were included in this study. The response rate of the volunteers who answered the questionnaire was 94.9%. Table 1 describes the socio demographic characteristics of the respondents. Most of the volunteers were female (65.7%) and 34.3% males. The greatest number of volunteers were aged 50-59 years of age (30.9%), followed by those aged 40-49 (27.1%). Education wise most of them had secondary education (65.3%) and were employed (55.7%.). Majority of the volunteers were married (80.4%).

Table 1 Socio demographic characteristics of KOSPEN volunteers (n=700)

Socio-demographic characteristics	n	%
Overall	700	
Sex		
Male	240	34.3
Female	460	65.7
Age		
18-29	93	13.3
30-39	105	15.0
40-49	190	27.1
50-59	216	30.9
60+	96	13.7
Education		
No formal education	16	2.3
Primary education	87	12.4
Secondary education	457	65.3
Tertiary education	140	20.0
Occupation		
Employed	390	55.7

Unemployed/retiree/homemaker	310	44.3
Marital status		
Single/Divorcee/widow/widower	134	19.1
Married	563	80.4

Table 2 shows the prevalence of volunteers who perceived management issues to be a barrier in conducting health screening activities. Most of the volunteers perceived funding (47.2%) to be a barrier in conducting health screening activities followed by human resources (21.4%). About 16% and 11% of the volunteers thought that screening equipment and educational materials were barriers in conducting health screening respectively.

Table 3 shows the prevalence of volunteers who perceived the training component to be a barrier in conducting health screening activities. Training component issues that were taken into account was the content in the training modules and its comprehensibility. Only 11.4% of the volunteers perceived the content of the module and comprehensibility of the module as a barrier in conducting health screening activities respectively.

Table 4 shows the prevalence of volunteers who perceived monitoring issues to be a barrier in conducting health screening activities. Monitoring issues include filling up health screening returns and the frequency of submitting those returns. Around 17.0% of volunteers found the frequency of submitting returns to be cumbersome while 7.8% felt doing the health screening returns itself to be a barrier in conducting health screening activities.

Table 5 shows factors associated with not performing health screening activities by the volunteers in the KOSPEN community. Logistic regression analysis showed significant association with volunteers who never attended training (cOR: 3.43, 95% CI 2.13, 5.52) and volunteers who felt the content of the training module was inadequate (cOR: 3.07, 95% CI 1.70, 5.56) with not performing health screening activities. Volunteers who found it difficult to understand the training module (cOR: 3.12, 95% CI 1.72, 5.66) and who felt the screening returns were non-user friendly (cOR: 2,72, 95% CI 1.34, 5.54) were more likely not to perform health screening activities. Contrarily, volunteers who had adequate screening equipment (cOR: 2.01, 95% CI 1.16, 3.48) were more likely not to perform health screening activities.

Through multivariate logistic regression, two factors were significantly associated with not performing health screening activities which are volunteers who never attended training and volunteers who felt the content of training was inadequate. We found that those volunteers who never attended training (aOR 2.79; 95% CI:1.66, 4.67) were more likely not to conduct health screening activities and also those volunteers who felt the content of the training module was inadequate (aOR 2.693; 95% CI: 1.46, 4.98) were more likely to not perform screening activities in the community.

Table 2 Prevalence of volunteers who perceived management issues to be a barrier in conducting health screening activities

Socio-demographic characteristics	Educational materials		Funding		Human resources		Screening equipment	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Overall	11.3%	9.10, 14.03	47.2%	43.41, 50.98	21.4%	18.36, 24.73	16.1%	13.53, 19.15
Sex								
Male	12.4%	8.55, 17.59	49.5%	42.80, 56.26	22.3%	17.14, 28.41	19.0%	14.20, 24.85
Female	10.8%	8.23, 14.13	45.9%	41.37, 50.58	20.8%	17.22, 24.87	14.7%	11.67, 18.23
Age								
18-29	7.7%	3.71, 15.27	34.4%	25.46, 44.69	18.0%	11.33, 27.33	15.6%	9.43, 24.58
30-39	13.5%	8.04, 21.90	51.6%	41.66, 61.38	24.0%	16.48, 33.47	18.8%	12.21, 27.69
40-49	14.5%	10.08, 20.49	52.0%	44.62, 59.21	24.6%	18.81, 31.43	17.3%	12.50, 23.50
50-59	9.0%	5.75, 13.82	44.2%	37.51 51.15	18.0%	13.25, 23.98	13.2%	9.13, 18.71
60+	11.5%	6.08, 20.80	52.6%	41.47, 63.41	22.5%	14.65, 32.93	17.7%	10.74, 27.83
Education								
No formal education	31.3%	13.64, 56.68	31.3%	13.65, 56.66	25.0%	9.68, 50.91	18.8%	6.13, 44.91
Primary education	14.8%	8.62, 24.27	49.4%	38.73, 60.09	27.2%	18.60, 37.83	14.8%	8.59, 24.36
Secondary education	9.9%	7.39, 13.22	47.8%	43.05, 52.60	20.8%	17.15, 25.05	16.3%	13.11, 20.19
Tertiary education	11.2%	6.86, 17.76	45.5%	46.07, 62.63	18.7%	12.95, 26.12	15.7%	10.45, 22.83
Occupation								
Employed	9.6%	6.92, 13.11	43.1%	38.06, 48.28	18.2%	14.52, ,22.58	13.8%	10.60, 17.78
Unemployed/retiree/homemaker	13.5%	10.01, 17.95	52.1%	46.36, 57.78	25.1%	20.38, 30.46	18.9%	14.81, 23.76
Marital status								
Single/Divorcee/widow/widower	9.6%	5.52, 16.17	45.6%	37.14, 54.33	16.8	11.19, 24.44	16.9	11.32, 24.56
Married	11.8	9.30, 14.92	47.6%	43.30, 51.80	22.5	19.08, 26.29	16	13.09,19.31

Table 3 Prevalence of volunteers who perceived 'training component' issues to be a barrier in conducting health screening activities

Socio-demographic characteristics	Module content		Comprehensibility of module	
	%	95% CI	%	95% CI
Overall	11.4%	9.16, 14.08	11.4%	9.15, 14.10
Sex				
Male	11.5%	7.86, 16.48	10.6%	7.07, 15.53
Female	11.3%	8.66, 14.74	11.8%	9.05, 15.23
Age				
18-29	12.5%	7.03, 21.25	9.0%	4.57, 16.92
30-39	8.5%	4.31, 16.12	7.4%	3.62, 14.69
40-49	10.6%	6.91, 15.97	14.6%	10.16, 20.55
50-59	11.4%	7.61, 16.73	10.9%	7.19, 16.14
60+	15.4%	8.93, 25.21	12.8%	7.03, 22.24
Education				
No formal education	12.5%	3.18, 38.29	6.3%	0.87, 33.66
Primary education	12.3%	6.77, 21.46	13.6%	7.68, 22.89
Secondary education	11.4%	8.63, 14.88	11.4%	8.63, 14.87
Tertiary education	10.7%	6.47, 17.14	10.7%	6.50, 17.08
Occupation				
Employed	9.1%	6.52, 12.54	9.1%	6.51, 12.56
Unemployed/retiree/homemaker	14.3%	10.67, 18.88	14.3%	10.64, 18.91
Marital status				
Single/Divorcee/widow/widower	10.7%	6.26, 17.56	11.4%	6.84, 18.34
Married	11.6%	9.14, 14.70	11.5%	8.97, 14.54

Table 4 Prevalence of volunteers who perceived 'monitoring' issues to be a barrier in conducting health screening activities

Socio-demographic variables	Health Screening returns		Frequency of submitting returns	
	%	95% CI	%	95% CI
Overall	7.8	5.9, 10.1	17.0	14.2, 20.1
Sex				
Male	6.7	4.0,11.0	17.2	12.7, 23.0
Female	8.3	6.0,11.3	16.8	13.6, 20.7
Age				
18-29	7.9%	3.8, 15.6	15.6%	9.4, 24.6
30-39	7.4%	3.6, 14.8	12.8%	7.4, 21.2
40-49	9.5%	6.0, 14.7	17.3%	12.4, 23.6
50-59	5.8%	3.2, 10.1	16.8%	12.1, 22.7
60+	9.0%	4.4, 17.6	23.4%	15.2, 34.1
Education				
No formal education	0.0%	-	12.5%	3.1, 38.7
Primary education	12.3%	6.8, 21.5	12.3%	6.8, 21.5
Secondary education	8.6%	6.3, 11.8	16.5%	13.3, 20.4
Tertiary education	3.1%	1.2, 8.0	21.7%	15.4, 29.6
Occupation				
Employed	5.7%	3.7, 8.6	17.3%	13.7, 21.6
Unemployed/retiree/homemaker	10.4%	7.4, 14.6	16.5%	12.6, 21.3
Marital status				
Single/Divorcee/widow/widower	8.9%	5.0, 15.3	14.6%	9.4, 22.1
Married	7.5%	5.5, 10.2	17.6%	14.6, 21.2

Table 5 Factors associated with not performing health screening activities in the KOSPEN community

	Logistic Regression			Multiple Logistic Regression		
Variables	Crude OR	95% CI	p value	Adjusted OR*	95% CI	p value
Sex						
Male	1					
Female	0.87	0.55, 1.38	0.566			
Age	1.003	0.99, 1.02	0.713			
Education						
No formal education	1					
Primary education	0.451	0.12, 1.67	0.234			
Secondary education	0.507	0.16, 1.64	0.257			
Tertiary education	0.353	0.10, 1.25	0.106			
Occupation						
Employed	1					
Unemployed/retiree/homemaker	1.287	0.83, 2.0	0.260			
Marital status						
Single/Divorcee/widow/widower	1					
Married	0.811	0.48, 1.38	0.440			
Training						
Attended	1			1		
Never attend	3.434	2.13, 5.52	0.000	2.785	1.66, 4.67	0.000
Educational materials						
No	0.668	0.35, 1.28	0.224			
Yes	1					
Funding barrier						
No	1					
Yes	1.088	0.7, 1.70	0.713			
Human resources						
No	1					
Yes barrier	1.319	0.78, 2.23	0.303			
Screening equipment						
Not adequate	1					
Adequate	2.008	1.16, 3.48	0.013			
Content of training				1		
Not adequate	3.069	1.70, 5.56	0.000	2.693	1.46, 4.98	0.002
Adequate	1					
Comprehensibility of training module						
Not easy to understand	3.124	1.72, 5.66	0.000			
Easy to understand	1					
Screening return						
Non-user friendly	2.721	1.34, 5.54	0.006			
User friendly	1					
Frequency return						
Burdensome	1					
Not burdensome	1.554	0.77, 3.12	0.216			

*Backward LR Multiple Logistic regression was applied. Multicollinearity and interactions were checked and not found. Hosmer Lameshow test P value = 0.878, Classification Table (overall correctly classified percentage = 86.6%) and ROC curve (area under ROC curve= 63.3%) were accepted to check model fitness.

DISCUSSION

Health screening activities are important in early detection of NCDs and their risk factors. Volunteers and community health workers have been widely recognised to help in reducing the burden of NCDs in their communities. In order to function well as community volunteers, they need to have sufficient training and resources in place to facilitate their work. In our study, we found training as an

important factor in determining if the volunteers would conduct health screening activities in the community. Volunteers who were not trained were not likely to perform screening activities. This could be due to lack of confidence since their knowledge is not adequate as community volunteers are usually lay persons with little or no medical training.[10,11,12] One study reported that effective training increases their knowledge about cardiovascular diseases and with this they would be able to perform non-invasive screening in their communities which could be achieved in a short time with little resources.[10, 13, 14] In a systematic review conducted by Marwa Abdel-All et al, eight studies were analysed for their effectiveness of training CHWs in terms of methods used and the training duration. It was reported that in all the studies, knowledge improved post training [15]. In a study by Kim Ozano et al., CHWs reported that multiple training sessions and refresher courses are needed to improve their performance [16]. This proves how important it is for the CHWs to be adequately trained prior to carrying out their duties. The KOSPEN volunteers however were required to attend a 2-day training course prior to being appointed but not all attended (73.8% attended) the training that was provided [8.] Some studies also emphasised the need for refresher training especially in anthropometric measurements.[10,11]

In this study, 17% reported that the frequency of submitting returns to be cumbersome. A suggestion by CHWs interviewed in another study was to include verbal reporting to reduce the time spent on written returns.[16]

Apart from training, job aids such as equipment [16] used to measure blood pressure, blood glucose, weight and height should be adequately available to these volunteers. 16.1% felt that inadequate screening equipment to be a barrier in conducting screening activities. Contrarily, in the univariate analysis, having adequate screening equipment were one of the factors associated with not performing health screening instead. Most studies reported the opposite where sufficient supplies increased the performance of CHWs. [11, 17]

In another study, CHWs performance depended on an integration of supervision, incentives, training, accountability, communication, supplies and logistics.[18] Therefore, we need foster a holistic approach to improve CHWs performance and to maintain their motivation as well.

In a qualitative study done in Swaziland, four changes were identified as possible ways to improve the performance of CHWs; i) an increase in incentives, ii) equipment and supplies that are more dependable, iii) more training and refresher courses, and iv) wider range of responsibilities.[18] These findings are in line with the findings of this study where by conducting health screening activities was hampered due to funding (47.2%), screening equipment (16.1%) and training module content and comprehensibility (11.4% respectively)

Another motivating factor that was reported by a number of studies was remuneration for these volunteers. Various studies showed that salary or remuneration given to the volunteers made them feel appreciated and encouraged them to continue serving their community[19,20,21] and community volunteers were mostly dissatisfied with their salaries.[22,23.] However, Ojo et al, reported otherwise.[24] However, this study did not explore this aspect in assessing the barriers faced by the volunteers in conducting the health screening activities.

CONCLUSION

This study provides findings about the importance of training for community health workers in conducting health screening activities in the KOSPEN programme. The findings showed that volunteers who never attended training and who felt the content of the training module was inadequate were more likely to not perform screening activities in the community. Several issues were identified by the volunteers; funding (47.2%), module content and comprehensibility (11.4% respectively), submitting returns (17%) and screening equipment (16.1%) as a barrier in performing health screening activities. This gives us an insight of challenges faced by the volunteers in conducting health screening activities. Attendance of the training should be a pre-requisite to qualify as a volunteer. Improvement to the training module should done to increase comprehensibility of the modules among the volunteers. Effective training is also required to increase the volunteer's knowledge on NCD screening activities. Attendance of training should be made compulsory and improvement to the training module should done to increase comprehensibility. By acknowledging this, programme managers and stakeholders would be able to cater and solve the issues faced by these volunteers who are the main driving force in the KOSPEN programme.

ACKNOWLEDGEMENT

We would like to thank the Director General of Health Malaysia for his permission to publish this article.

Author Disclosures

The authors declare that they have no conflicting interests.

REFERENCES

1. Shin HR, Varghese C. WHO Western Pacific Regional Action Plan for the Prevention and Control of NCDs (2014-2020). Epidemiol Health. Available online at: 2014:e2014007.

doi:10.4178/epih/e2014007.
2. Community Health Workers: World Health Organization (WHO). Available online at: https://www.who.int/workforcealliance/knowledge/themes/community/en/.
3. Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020; 2013.
4. Denman CA, Rosales C, Cornejo E, et al. Evaluation of the community-based chronic disease prevention program Meta Salud in Northern Mexico, 2011-2012. Prev Chronic Dis. 2014;11(9):1-9. doi:10.5888/pcd11.140218.
5. Alaofè H, Asaolu I, Ehiri J, et al. Community Health Workers in Diabetes Prevention and Management in Developing Countries. Ann Glob Heal. 2017; 83(3-4): 661-675. doi:10.1016/j.aogh.2017.10.009.
6. Gyawali B, Mishra SR, Neupane D, Vaidya A, Sandbæk A, Kallestrup P. Diabetes management training for female community health volunteers in Western Nepal: An implementation experience. BMC Public Health. 2018;18(1):1-10. doi:10.1186/s12889-018-5562-y.
7. Malaysia Ministry of Health (MOH). National Strategic Plan for Non-Communicable Disease (NSP-NCD): Medium Term Strategic Plan to Further Strengthened the NCD Prevention and Control Program in Malaysia (2016-2025). 2016:28.
8. Selangor Health Department. Komuniti Sihat Pembina Negara. 2016:1-13.
9. Kuang Kuay L, Ismail H, Liana Ab Majid N, et al. Community Empowers the Nation Programme (KOSPEN) 1166 PUBLIC HEALTH RESEARCH Factors Associated with Non-Participation in a Health Screening Programme and Its Barriers: Findings from the Community Empowers the Nation Programme (KOSPEN), Malaysia 2016.
10. Abrahams-Gessel S, Denman CA, Mendoza Montano C, et al. The Training and Field Work Experiences of Community Health Workers conducting non-invasive, population-based screening for Cardiovascular Disease in Four Communities in Low and Middle-Income Settings HHS Public Access. Glob Hear. 2015;10(1):45-54.doi:10.1016/j.gheart.2014.12.008.
11. Geldsetzer P, De Neve JW, Boudreaux C, Bärnighausen T, Bossert TJ. Improving the performance of community health workers in Swaziland: Findings from a qualitative study. *Hum* Resour Health. 2017;15(1):1-9. doi:10.1186/s12960-017-0236-x.
12. Fatmah. Pengaruh Pelatihan pada Peningkatan Pengetahuan dan Keterampilan Teknis Penyuluhan Obesitas dan Hipertensi Kader Posbindu Kota Depok. Makara Seri Kesehat. 2013;17(2):49-54. http://garuda.ristekdikti.go.id/documents/detail/149532.
13. Gaziano TA, Abrahams-Gessel S, Denman CA, et al. An assessment of community health workers' ability to screen for cardiovascular disease risk with a simple, non-invasive risk assessment instrument in Bangladesh, Guatemala, Mexico, and South Africa: An observational study. Lancet Glob Heal. 2015;3(9):e556-e563. doi:10.1016/S2214-109X(15)00143-6.
14. Gaziano TA, Bertram M, Tollman SM, Hofman KJ. Hypertension education and adherence in South Africa: A cost-effectiveness analysis of community health workers. BMC Public Health. 2014;14(1). doi:10.1186/1471-2458-14-240.
15. Abdel-All M, Putica B, Praveen D, Abimbola S, Joshi R. Effectiveness of community health worker training programmes for cardiovascular disease management in low-income and middle-income countries: A systematic review. BMJ Open. 2017;7(11):1-11. doi:10.1136/bmjopen-2016-015529.
16. Ozano K, Simkhada P, Thann K, Khatri R. Improving local health through community health workers in Cambodia: challenges and solutions. Hum Resour Health. 2018;16(1):2. doi:10.1186/s12960-017-0262-8.
17. Chung MHL, Hazmi H, Cheah WL. Role performance of community health volunteers and its associated factors in Kuching district, Sarawak. J Environ Public Health. 2017;2017. doi:10.1155/2017/9610928.
18. Kok MC, Broerse JEW, Theobald S, Ormel H, Dieleman M, Taegtmeyer M. Performance of community health workers: Situating their intermediary position within complex adaptive health systems. Hum Resour Health. 2017;15(1):1-7. doi:10.1186/s12960-017-0234-z.
19. Ding H, Sun X, Chang W wei, Zhang L, Xu X ping. A Comparison of Job Satisfaction of Community Health Workers before and after Local Comprehensive Medical Care Reform: A Typical Field Investigation in Central China. PLoS One. 2013;8(9):1-5. doi:10.1371/journal.pone.0073438.
20. Luo Z, Bai X, Min R, Tang C, Fang P. Factors influencing the work passion of Chinese community health service

workers: An investigation in five provinces. BMC Fam Pract. 2014;15(1):1-9. doi:10.1186/1471-2296-15-77.

21. Glenton C, Colvin C, Carlsen B, Swartz A, Lewin S, Noyes J. A systematic review of barriers and facilitators to the implementation of lay health worker programmes for maternal and child health. cochrane database Syst Rev. 2013;(10):1-4. doi:10.1002/14651858.CD010414.pub2.www.cochranelibrary.com.
22. Hasan H, Aljunid SM. Job satisfaction among Community-Based Rehabilitation (CBR) workers in caring for disabled persons in the east coast region of Peninsular Malaysia. BMC Public Health. 2019;19(1):1-9. doi:10.1186/s12889-019-6520-z.
23. George MS, Pant S, Devasenapathy N, Ghosh-Jerath S, Zodpey SP. Motivating and demotivating factors for community health workers: A qualitative study in urban slums of Delhi, India. WHO South-East Asia J public Heal. 2017;6(1):82-89. doi:10.4103/2224-3151.206170.
24. Ojo TT, Hawley NL, Desai MM, Akiteng AR, Guwatudde D, Schwartz JI. Exploring knowledge and attitudes toward non-communicable diseases among village health teams in Eastern Uganda: A cross-sectional study. BMC Public Health. 2017;17(1):1-11. doi:10.1186/s12889-017-4954-8.