

Improving Cadres Knowledge and Skills in Non-Communicable Disease Control and Care in Kulonprogo, Yogyakarta

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ABSTRACT

Background: Non-communicable disease (NCD) necessitates prolonged continuous intervention that impacts enormous morbidity, mortality, and socioeconomic repercussions on a global scale. Community and private primary healthcare facilities need to be more interconnected, although they have significant roles in NCDs' prevention and care. **Aims:** To enhance the community's competencies regarding NCDs through the involvement of private primary care. **Method:** The method used was a quasi-experiment (non-control, nonrandomisation) with the 'Aisyiyah Clinic involvement as the mentor for participants. The study involved 41 faith-affiliated cadres from 'Aisyiyah and Nasyiatul Aisyiyah, Kulonprogo, Yogyakarta Special Region Province, Indonesia. Interventions include health education sessions on NCDs and essential health examinations for NCD screening practices. The study evaluation was conducted using a pre-test and post-test of knowledge and skill observation checklist, followed by the Wilcoxon signed-rank, Spearman, and Kruskal-Wallis tests. **Results:** Education and practices increased participants' knowledge of NCDs ($p=0.000$) with a large effect size ($r=0.50$). The cadres also observed that they could perform their competencies in these examinations (100%). Additionally, there was no significant difference in knowledge (pre-test and post-test) based on cadres' demographic background ($p>0.05$). In contrast, there was a significant difference in initial knowledge (pre-test), according to both duration of time as a cadre ($p = 0.011$). **Conclusion:** Health education and practices effectively increase health cadres' knowledge and skills related to NCD control. Simultaneously with continuous community empowerment, the study findings highlight a need for better integration between public health initiatives and private sector resources to sustainably improve the community health workers' role.

Keywords: Chronic Diseases, Community Health Worker, Health Cadres, Private Primary Care

INTRODUCTION

Globally, non-communicable diseases (NCDs), such as cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, are leading causes of morbidity and mortality (Hiremath Lalita, & Hiremath Dhananjaya], 2012). They account for approximately 71% of all global deaths, with 15 million people aged 30-69 years dying prematurely each year (WHO, 2020). NCDs also impose substantial socioeconomic burdens, contributing to healthcare costs and loss of productivity

(Oktaria & Mahendradhata, 2022; Hiremath Lalita, & Hiremath Dhananjaya, 2012). The global community recognises the urgency of addressing NCDs, as emphasised by the World Health Organization's Global Action Plan for the Prevention and Control of NCDs 2013-2020, which aims to reduce the burden of NCDs through comprehensive and coordinated approaches (Hunter & Reddy, 2018).

In Indonesia, NCDs have become a significant public health challenge, contributing to more than 70% of the country's total mortality (Republic

Indonesia Ministry of Health, 2018). The prevalence of risk factors such as smoking, physical inactivity, unhealthy diets, and hypertension is high among the population (Arifin et al., 2022). The Indonesian government has implemented various policies to combat NCDs, including the National Action Plan for NCD Prevention and Control and the integration of NCD services into primary healthcare (Republic Indonesia Ministry of Health, 2017; WHO, 2018a). However, despite these efforts, gaps remain in the effective management and control of NCDs, particularly at the community level.

Despite the existing policies and efforts to manage NCDs in Indonesia, there are significant gaps in the implementation and effectiveness of these strategies, especially in community-based settings. One critical gap is the underutilisation of private primary care facilities, which serve a large portion of the population but must be connected with community health workers (CHWs). Research has shown that private primary care providers cater to a substantial number of patients and have the potential to impact NCD management significantly (Arini et al., 2022; Marshall et al., 2023). However, the lack of integration between these private entities and community health workers limits their effectiveness in comprehensive NCD control (Kamvura et al., 2022; Leon & Xu, 2023). This disconnect highlights the need for collaborative approaches that leverage the strengths of both private primary care and community health cadres.

Empowering healthcare cadres through training and education plays a vital role in enhancing the capacity of the healthcare workforce, particularly in addressing NCDs (Andrianto et al., 2020; Kosasih et al., 2019). By leveraging non-physician health workers to perform tasks traditionally carried out by health professionals, empowerment initiatives improve efficiency and access to care, especially in underserved areas (Woldie et al., 2018). These initiatives not only enhance job satisfaction and retention among healthcare workers by offering professional development opportunities and adequate resources (Carboni et al., 2023), but also contribute to more effective NCD prevention, diagnosis, and management, ultimately leading to improved public health outcomes (Abdel-All et al., 2017; Reynolds et al., 2018). By

building a skilled and motivated cadre, healthcare systems can better control and care for NCDs, ensuring a more comprehensive and accessible healthcare delivery system.

Enhancing community engagement in the care of NCDs follows the strategies outlined in the Chronic Care Model (CCM) (Reynolds et al., 2018). Hence, interconnecting community is essential in developing a model for chronic disease management and involves four interconnected components: health service providers, health service systems, community partners, and patients and their families (Maimela et al., 2018). This model employs an integrated and coordinated approach.

This study addresses these gaps by initiating the linking of faith-affiliated health cadres with private primary care to improve knowledge about preventing and managing NCDs. Although community empowerment initiatives are frequently conducted by research, this study is unique due to the private sector involvement and the highlight of the faith-based-affiliated cadres. Most of them are not formerly health cadres, but they have value and the potential to become health cadres and strengthen NCD care and control in the community (Soni et al., 2023). Specifically, the study seeks to enhance the competencies of community health workers through targeted education and training sessions on chronic diseases and essential health examinations as a pilot model for private sector-community engagement. The findings are expected to provide insights into practical strategies for continuous community empowerment, private sector engagement, and sustainable health interventions ultimately contributing to the broader goal of reducing the NCD burden in the country.

METHODS

Study Design

The methods used in this study are quasi-experiments (no control, nonrandomisation). As the study uniqueness, to enhance the sustainability of the community empowerment programme, 'Aisyiyah Sewugalur Clinic was involved as a mentor for the community. The intervention package was formulated together with this clinic. This study was conducted in Sewugalur, Kulon Progo,

Yogyakarta, Indonesia as part of a series of umbrella studies on establishing a faith-affiliated health community cadre in this area.

The interventions implemented in this study encompass health education on chronic diseases and their prevention and management. Two role-play practice sessions were provided: 1) basic physical examination, consisting of anthropometric measurements, body mass index (BMI) calculation and interpretation, and blood pressure measurement; 2) blood glucose, uric acid, and cholesterol screening using test strips. The second author performed the role of an educator in a 90-minute lecture presentation that included a question-and-answer segment. The other authors and clinic staff served as mentors during training sessions, guiding role-playing and assisting practice exercises.

Participants and Sampling Technique

The participants were members from 'Aisyiyah and Nasviatul 'Aisyiyah Kulonprogo, Yogyakarta Special Region Province recruited purposively using criterion sampling. The total number of participants was 41.

The inclusion criteria in this study programme include being an active member of one of these two women organisations, being willing to actively engage in all study endeavours, and being of legal age, precisely over 18. These two organisations are autonomous women's organisations within Muhammadiyah, one of Indonesia's most significant Islamic mass movements.

Data Collection

Data were collected by giving a pre-test before the intervention was carried out and a post-test after completion. There are ten statements in the offline paper-based questionnaire with binary true-false answer choices. The researcher prepared the questionnaire based on material in the health education session given to the participants. The questions were about general knowledge about signs and symptoms, prevention, and care of NCDs. For the construct and face validity, the questionnaire was reviewed by community health experts. Cadre's skills in conducting anthropometric measurements, BMI calculation and interpretation, and strip test screening were evaluated with structured

observation (post-test only). Cadres' skills were scored 0-100% according to the accuracy of practising examinations compared to observation checklists.

Data Analysis

The obtained data were then analysed using descriptive statistics to determine the frequency of participants' demographic data. Due to the data being not normally distributed, a difference test was carried out using the Wilcoxon signed-rank test to evaluate any changes in the level of knowledge before and after the intervention was given. The effect size (r) calculation was carried out to determine the strength of the impact of the intervention on participants' knowledge. Finally, a comparative test was carried out (Kruskal-Wallis and Mann-Whitney U) between age categories, last education, employment, period as health cadre, and formal cadre training history with pre-test and post-test score. The entire analysis was carried out using SPSS software.

Ethics

This study has received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Muhammadiyah University of Yogyakarta, with No. 071/EC-KEPK FKIK UMY/1/2024. Before study was carried out, all participants had received a detailed explanation and provided written consent.

RESULTS AND DISCUSSION

Forty-one individuals participated in this study (Table 1). The data on education levels indicate that most participants are relatively well-educated, with nearly half being high school graduates (48.8%) and a similar proportion holding a diploma or bachelor's degree (46.3%). Furthermore, 19 participants (46.3%) were predominantly housewives or retirees. A half of (51.2%) the total had yet to gain experience as formal health cadres. Similarly, 22 participants, representing 53.7%, had never received formal training from the government.

The participants' demographic characteristics reveal essential insights relevant to the effectiveness and potential of health education interventions. All participants were women, reflecting women's significant role in community

health efforts, particularly in Indonesia; Arini & Primastuti, 2023). Several participants were more than 60 years old, which aligns with other study showing older adults often participate in health-related community activities (Najafi et al., 2023). Moreover, the finding that most participants were homemakers or retirees highlights a demographic with potentially more time to commit to community health activities as supported by previous studies that found that homemakers and retirees often have more flexibility to engage in volunteer health work (Andrianto et al., 2020; Arini & Primastuti, 2023).

Table 1. Participant Characteristics

Variable	Category	n	%
Gender	Man	0	0
	Woman	41	100
Age (years old)	20 - 40	18	43.9
	41 - 60	18	43.9
	>60	5	12.2
Last education	Junior high school	1	2.4
	Senior high school	20	48.8
	Diploma/Bachelor	19	46.3
	Postgraduate	1	2.4
Work	Formal sector	8	19.5
	Informal sector	7	17.1
	Student	4	9.8
	Health workers	3	7.3
	Unemployed/house wife/retired	19	46.3
Period of being health cadre (years)	0	22	53.7
	> 0 - 5	11	26.8
	> 5 - 10	4	9.8
	> 10	4	9.8
Formal Training History	Never	21	51.2
	Have attended training	20	48.8

The relatively high educational attainment among participants is noteworthy. This finding contrasts with some studies in similar settings where educational levels were lower, potentially limiting the effectiveness of training programs (Babagoli et al., 2021; Fenta et al., 2024). However, over half had no experience as health cadres, and a similar percentage had never received formal training, suggesting a significant gap in

preparedness and capacity. The data align with study by Carboni et al. (2023), which emphasised the need for targeted training to enhance the effectiveness of community health workers. The substantial proportion of participants without formal training or cadre experience underscores the critical need for capacity-building initiatives. The data are consistent with findings from a study by Abdel-All et al. (2017) which demonstrated that structured training programmes significantly improve the knowledge and skills of cadres. Overall, these findings emphasise the potential for targeted education and training programmes to significantly enhance the capabilities of community health workers, particularly those who are well-educated but need more formal training and experience.

Participants' improvement knowledge was measured using a pre-test and post-test. Since the data were determined to be non-normally distributed based on the normality test results ($p=0.000$), the Wilcoxon signed-rank test was conducted. The mean score improved from 6.34 to 7.68, with the difference test yielding a p -value of 0.000, indicating a statistically significant difference between the pre-intervention and post-intervention periods concerning education and training on managing chronic diseases (Table 2). The cadres also observed that they could perform competently in these examinations skills (100%) (Table 3).

Subsequently, the effect size (r) calculation yielded a result of 0.50, strengthening evidence that the intervention significantly enhanced participants' knowledge. Here are the formula and findings of the effect size calculation:

$$r = \frac{Z}{\sqrt{n}} = \frac{4.550}{\sqrt{82}} = \frac{4.550}{9.055385138137417} = 0.5024634436405518 \approx 0.50$$

Table 2. Normality Test and Wilcoxon Signed-Rank Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Wilcoxon Signed-Rank Test			
	S	df	p	S	df	p	Mean	SD	Z	p
Pre-test	0.236	41	0.000	0.874	41	0.000	6.34	1.109		
Post-test	0.444	41	0.000	0.595	41	0.000	7.68	0.567	4.55	0.000

^aS=statistic; df=degree of freedom; SD=standard deviation

Table 3. Cadre's Competency After Hands-on Training

Skills	Achievement (n=41)
Anthropometric measurement	100%
Body mass index calculation and interpretation	100%
Blood pressure measurement	100%
Blood glucose test	100%
Uric acid test	100%
Cholesterol test	100%

The study findings show that education and training can significantly increase participants' knowledge regarding NCDs and their management. Research studies have shown that through educational programmes and training sessions, cadres can significantly improve their abilities to control NCD risk factors (Abdel-All et al., 2017), provide mental health support (Eka et al., 2023), support joint disorder prevention with exercises (Fauzia et al., 2023), and deliver comprehensive health services for the elderly (Arini & Primastuti, 2023). These initiatives involve various methods such as lectures, discussions, demonstrations, and practical exercises to equip cadres with the necessary expertise. These findings also align with research that explains that interactive training and education programmes carried out simultaneously can significantly increase the knowledge of female cadres about hypertension (Andrianto et al., 2020). The results indicate a notable increase in knowledge levels, skills proficiency, and the ability to provide counselling and conduct assessments independently, ultimately contributing to more effective NCD prevention and management strategies within communities.

This study demonstrates the significant impact of private clinics in enhancing community health cadres' knowledge and skills in NCD through practical training. The improved skills among cadres align with the findings by Abdel-All et al. (2017) and Carboni et al. (2023), who emphasised the effectiveness of structured and experiential training programmes. Several healthcare professionals' tasks could be shifted to CHWs by providing training (Seneviratne et al., 2022). A systematic review also proved that programmes involving CHWs navigation enhanced compliance with cancer screening and promoted the utilisation of primary care for managing chronic diseases effectively. Therefore, it is essential to consider the recruitment criteria, the time frame, and the method of training and supervision

procedures to ensure the high-quality performance of CHWs (Mistry et al., 2021). The study findings highlight a need for better integration between public health initiatives and private sector resources. Overall, the study underscores the pivotal role of private clinics in strengthening community health efforts against NCDs. Although the cadres' skills showed exemplary achievements, regular refreshing trainings are needed to ensure sustainable competency. Studies have evidenced that knowledge and skills achievements always require repetitive learning (Cervantes et al., 2022; Westgate et al., 2021). Increasing cadre knowledge occurs with education and training about chronic diseases accompanied by implementing multi-strategy, context-specific evaluation capacity-building efforts focusing on long-term results and impacts at various levels (LaMarre et al., 2020).

Furthermore, we conducted comparison between demographic data and pre-and post-tests. The analysis findings indicated no significant difference in knowledge (pre-test and post-test) based on age, education, and occupation categories ($p > 0.05$). In contrast, there was a significant difference in initial knowledge, as measured by the pre-test, according to both duration of time as a cadre ($p = 0.011$) and formal training history ($p = 0.049$) (Table 4).

Table 4. Comparison of Cadres' Knowledge by Demographic Attributes

Test	Variables	Knowledge	
		Pre-Test (p-value)	Post-Test (p-value)
Kruskal-Wallis H	Age category	0.369	0.789
	Education category	0.263	0.134
	Occupation category	0.200	0.498
	Period of being health cadre	0.011*	0.123
Mann-Whitney U	Formal training history	0.049*	0.206

This study revealed no significant disparity in knowledge amongst cadres regardless of their age, education, and job categories, both before and after the test. However, the training background and duration as a cadre significantly differ in the first level of knowledge (pre-test). According to a prior study, there is a tendency for knowledge to develop progressively between the ages of 18 and around 40-50 years. However, the situation

can stabilise or decline due to the lack of ongoing education (Salthouse, 2003). Conversely, a study conducted in Iran demonstrated a positive relationship between age and information acquisition (Anbarlo & Irvanlo, 2015). Consistent with our investigation, a study conducted in England found no correlation between schooling and enhancing health knowledge (Johnston et al., 2015).

Our findings differ from those of research conducted in Indonesia, which discovered that higher levels of formal education can considerably enhance learning (Andrianto et al., 2020). Several factors influence the effectiveness of education and training for cadres' knowledge regarding chronic diseases, including learning theory, behaviour change, and collaborative approaches (Ruiz, 2012). On the other side, other factors influencing increasing community knowledge are cultural perceptions, beliefs, and extrinsic motivators (Manus et al., 2016).

Education and training, which are interconnected with primary care, as implemented in our study, are essential initial steps for encouraging community and private sector involvement in managing chronic diseases more integratively. The Chronic Care Model (CCM), one of the most comprehensive frameworks, involves utilising resources from various entities, including public health organisations, healthcare systems, communities, governments, and individuals, to change chronic disease prevention and address health inequities to eliminate them (Barr et al., 2003; New York State Department of Health, 2013). A review paper revealed that empowered CHWs can perform three prominent functions that support healthcare facilities, especially primary care, including clinical care, community resource linkages, and health education and coaching (Hartzler et al., 2018). However, several barriers to private health sector engagement in NCDs control and care include the complexity of providers, lack of system integration, equity issues, and higher costs for privately delivered services, which emerged from several previous study (Collins et al., 2023; Siddiqi et al., 2023). Hence, these barriers to private health sector engagement for NCD control necessitating government

regulation and more comprehensive approach.

This study presents notable strengths and limitations that should be considered. The close engagement of researchers and clinics with participants in our study enhances the interactive learning process, as our study strengths. Our study limitation pertains to the short-term education and training session for enhancement of community knowledge and skills. Therefore, conducting a comprehensive assessment of behavior and knowledge change is crucial for long-term evaluation. Furthermore, as an Islamic mass organisation, the participants in our study possess a few distinctive characteristics that may differ from those in other study settings. Hence, it is crucial to consider the contextual aspect of community-based intervention.

CONCLUSION

Community education and hands-on training, interconnected with private primary care, effectively increase participants' knowledge and skills about NCDs. The effectiveness of the intervention was not influenced by demographic factors, and training history and length of work only have significant differences in initial knowledge, indicating that this programme can be widely implemented regardless of participant background. These findings make this intervention a potential model for similar programmes in the future.

Further interconnection models between CHWs and private primary care still need to be tested, especially in long-term action in the community. Future research is recommended to test the effectiveness of changing the behaviour and practices of health cadres over a long period. Continuous capacity building and smooth engagement with healthcare facilities and other stakeholders are required to improve the quality of care by the community.

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