



# Unlocking Success: Determining Predictors of High-Performance among COMBI Community Health Volunteers in Kuala Lumpur and Putrajaya

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## Abstract

**Background:** Community Health Volunteers (CHVs) are crucial in achieving universal health coverage and vital in public health activities, including the COMBI (Communication for Behavioral Impact) approach for dengue prevention and control and assessing the performance of COMBI CHVs are essential in evaluating the program effectiveness. We aimed to measure the level of performance and determine predictors of high-performance among COMBI CHVs in Kuala Lumpur and Putrajaya.

**Methods:** A cross-sectional study was conducted in 2023 among 285 COMBI CHVs from 5 health operational zones in Kuala Lumpur and Putrajaya. The CHVs were stratified proportionately, with 45.5% of respondents randomly selected from each stratum based on their zones. Self-administered questionnaires assessed their performance level and associated factors, including training, supervision, knowledge, motivation, and job satisfaction. Chi-square and Multiple Logistic Regression tests were used to determine the factors and predictors of high-performance COMBI CHVs.

**Results:** The prevalence of high-performance COMBI CHVs was 59.3%, significantly associated with training factors (experience, duration, and adequacy of training), supervision factors (being supervised, supervision frequency, and encouragement from supervision), motivation and job satisfaction level. As for significant predictors, having at least one day of training (AOR=14.557), being supervised by medical personnel (AOR=4.997), having a high motivation level (AOR=5.538) and having a high job satisfaction level (AOR=4.562) were more likely to have a high-performance level.

**Conclusion:** Training duration, supervisor background, motivation and job satisfaction can contribute to high-performance levels among COMBI CHVs, which can applied in evidence-based policies and strategies for performance improvement and more effective community healthcare delivery.

**Keywords:** Performance level; Success Community; Community Health Volunteers; COMBI Program

## Introduction

The 1978 Alma Ata Declaration emphasised the importance of universal access to primary

healthcare through community participation (1). Community Health Workers, including Commu-



nity Health Volunteers (CHVs), were recognised as vital components of healthcare, especially in low and middle-income countries, aiming for universal health coverage and community-based health promotion (2). In developing nations, CHVs address challenges like child and maternal mortality linked to poor health literacy, poverty, and geographical barriers (3–5). Meanwhile, in developed countries, CHVs focus on issues related to the aging population, such as promoting elderly health, fall prevention, and mental health (6). In Malaysia, CHVs play crucial roles in various health programs, such as oral healthcare, correct medicine awareness, and disease control, including non-communicable and communicable diseases. Malaysia's Communication for Behavioral Impact (COMBI) program has utilised CHVs for dengue prevention and control for the past two decades. Active community engagement in activities aimed at exterminating mosquito breeding sites increases the efficacy of control strategies, as shown by promising results that directly contribute to reducing dengue cases (7). Improving community awareness, maintaining clean surroundings, and inducing behavioral change through health education can indirectly reduce dengue cases over time (7).

As of December 2022, Malaysia had implemented the COMBI program in approximately 3,252 localities, including 132 in Kuala Lumpur and Putrajaya. Despite ongoing efforts and an increasing number of COMBI CHVs each year, Malaysia saw a staggering 150.7% rise in cumulative dengue cases in 2022, totaling 66,102 cases compared to 26,365 cases in 2021, with Kuala Lumpur and Putrajaya ranked third in the country in 2022, following Selangor and Sabah (8). The rise in cases highlights the need for better support for CHVs, apart from regular training efforts (8). The COMBI program has achieved short-term success but needs to deliver the desired behavioral impact (9). The economic impact is substantial, with Malaysia spending approximately RM 294 million annually on the National Dengue Vector Control Program, which includes COMBI CHV activities. This

expenditure accounts for 0.03% of the country's gross domestic product (GDP) and 1.2% of government healthcare funding. Therefore, understanding factors affecting CHVs' performance is crucial for reducing dengue cases and optimising program cost-effectiveness (10).

Assessing CHVs' performance is vital to gauge program success in addressing community health issues. Globally, CHVs' high-performance stands at 54.4%, while locally, it is 59% (11,12). Various factors influencing their performance include sociodemographics, knowledge, training, supervision, motivation, and job satisfaction (11–16). Low performance can lead to increased dropout rates, reduced credibility, and wasted resources (5). Since most CHV-related health programs are concentrated in rural regions, understanding factors affecting CHVs' effectiveness in urban settings like Kuala Lumpur and Putrajaya is crucial for equitable health program access (5,17).

Even with the importance of CHVs, research on their performance in the COMBI program in Malaysia remains limited. Assessing COMBI CHVs' performance and associated factors is essential for program evaluation and enhancing dengue prevention efforts. Identifying these factors can lead to tailored training programs, improving CHVs' performance.

We aimed to measure the level of performance and determine predictors of high-performance among COMBI CHVs in Kuala Lumpur and Putrajaya, filling local research gaps and promoting better universal health coverage.

## **Materials and Methods**

This cross-sectional study involved 300 COMBI CHVs supervised by the Kuala Lumpur and Putrajaya State Health Department (JKWPKL&P) across five health operational zones: Cheras, Lembah Pantai, Titiwangsa, Kepong, and Putrajaya. Stratified proportionate random sampling was applied, where the CHVs were divided into strata based on the zones and randomly selected 45.5% of respondents from each stratum.

Inclusion criteria included CHVs aged 18 years and older, regardless of gender, participating in the COMBI Program of JKWP&P, and proficient in Malay or English. Exclusion criteria applied to CHVs unable to effectively read or write for questionnaire responses.

Data collection for this study took place from April to May 2023, utilising a self-administered questionnaire adapted from past studies (12,14,18–22). The questionnaire comprised six sections: sociodemographic (7 items), training and supervision (8 items), knowledge (17 items), motivation (7 items), job satisfaction (15 items) and performance (7 items). Knowledge questions covered dengue disease's etiology, recurrence, signs, symptoms, transmission, prevention, precautions, treatment, and complications (19,20). Median and 75<sup>th</sup> percentile were used as cut-off points. A score above the median indicates good knowledge of COMBI CHVs, while a score above the 75<sup>th</sup> percentile indicates high motivation and job satisfaction levels (12,14,21). Performance was assessed based on work-related domains such as raising awareness, encouraging community participation, report submission, and search and destroy activities (12,22). The summation of scores determined the level of performance, with the median score serving as the cut-off point. Higher scores than the median indicate a high-performance level, and vice versa. Pilot testing with 30 respondents ensured questionnaire reliability, yielding consistent results with Cronbach's alpha values ranging from 0.716 to 0.953. Two sets of questionnaires in English and Malay were employed for consistency and instrument reliability. Modifications to the questionnaire were made based on content and face validity assessments.

The collected data were analysed using IBM Statistical Package of Social Sciences System (SPSS) version 27.0 software. Initial steps included descriptive analysis to identify errors

and missing data and to summarise the data. For data normality assessment, both graphical tests (histogram, box plot, and p-p plot) and statistical tests (Kurtosis/Standard error, Skewness/Standard error, Kolmogorov-Smirnov test, and Shapiro-Wilk test) were conducted (23,24). For some non-normally distributed data, categorical transformations were applied to enable further statistical analysis. For bivariable analysis, the Independent T-test, Mann-Whitney U test, Chi-square test and Simple Logistic Regression (SLR) test were used to determine the association between independent and dependent variables. Independent variables with *P*-value <0.25 in SLR were further analysed using Multiple Logistic Regression to identify predictors for high-performance among COMBI CHVs in Kuala Lumpur and Putrajaya (25).

This study received ethical approval from the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM-2023-184) and the Medical Research Ethics Committee (MREC) of the Ministry of Health (NMRR ID-23-00774-SPK). The research adhered to the principles of the Declaration of Helsinki and Malaysian Good Clinical Practice Guidelines.

## Results

The response rate was 95%, with 285 out of 300 respondents participating in this study. The sociodemographic distribution of the respondents is presented in Table 1. The mean age of the respondents was  $47.57 \pm 11.09$  years, ranging from 18 to 76 years old, with almost more female distribution (53%). The majority of them were Malays (96.8%), married (87.4%), public servants (32.6%) and had at least a tertiary education background (48.8%). Regarding monthly household income, the median among the respondents was RM3000 (IQR 4000).

**Table 1:** Sociodemographic distribution among respondents (N=285)

<i>Variables</i>	<i>Frequency</i>	<i>Percentage (%)</i>
	Mean±SD / Median (IQR)	
Age(yr)	47.57±11.09	
Gender		
Male	134	47.0
Female	151	53.0
Ethnicity		
Malay	276	96.8
Chinese	3	1.1
Indian	6	2.1
Education Level		
No formal	1	0.4
Primary	7	2.5
Secondary	138	48.4
Tertiary and above	139	48.8
Marital status		
Single	14	4.9
Married	249	87.4
Widow/widower/divorcee	22	7.7
Monthly Household Income (RM)	3000(4000)	
Employment status		
Public servant	93	32.6
Private sector	56	19.6
Self-employed	45	15.8
Housewife	51	17.9
Student	1	0.4
Pensioner	25	8.8
Unemployed	14	4.9

*Note.* SD=Standard deviation; IQR=Interquartile range

For CHV performance level (Median: 6; IQR: 2), 59.3% demonstrated high-performance, and 40.7% had a low-performance. The majority of respondents received the COMBI training program (52.3%), conducted in community-based locations, with most having less than one day of training (53%) and finding it adequate (68.5%). About 56.8% were supervised by medical personnel, with supervision frequencies varying. Notably, 84.6% felt supervision enhanced their commitment. Most of the respondents reported

having good knowledge (51.2%), low motivation (61.8%), and low job satisfaction (69.1%) in their COMBI volunteering activities.

Table 2 shows several factors that showed significant associations with performance: training experience ( $P=0.002$ ), training duration ( $P<0.001$ ), training adequacy ( $P<0.001$ ), being supervised ( $P<0.001$ ), supervision frequency ( $P=0.015$ ), supervision encouragement ( $P<0.001$ ), motivation ( $P<0.001$ ) and job satisfaction ( $P<0.001$ ).

**Table 2:** Association between sociodemographic, training, supervision, knowledge, motivation and job satisfaction factors with the performance level (N=285)

Variables	Performance level		$\chi^2$ (df)	P-value
	High n (%)	Low n (%)		
Gender				
Male	81 (60.4)	53 (39.6)	0.138 (1)	0.710
Female	88 (58.3)	63 (41.7)		
Ethnicity				
Malay	161 (58.3)	115 (41.7)	3.372 (1) <sup>a</sup>	0.088
Non-Malay	8 (88.9)	1 (11.1)		
Education Level				
Secondary and below	86 (58.9)	60 (41.1)	0.019 (1)	0.890
Tertiary and above	83 (59.7)	56 (40.3)		
Marital status				
Married	145 (58.2)	104 (41.8)	0.927 (1)	0.336
Single/Widow/widower/divorcee	24 (66.7)	12 (33.3)		
Employment status				
Working	114 (58.8)	80 (41.2)	0.072 (1)	0.788
Not working	55 (60.4)	36 (39.6)		
Training Experience				
Yes	101 (67.8)	48 (32.2)	9.318 (1)	0.002*
No	68 (50.0)	68 (50.0)		
Location (n=149)				
Community-based	89 (67.9)	42 (32.1)	0.012 (1)	0.914
Government-based	12 (66.7)	6 (33.3)		
Duration (n=149)				
<1 day	39 (49.4)	40 (50.6)	26.123 (1)	<0.001*
≥1 day	62 (88.6)	8 (11.4)		
Adequacy (n=149)				
Yes	79 (77.5)	23 (22.5)	13.835 (1)	<0.001*
No	22 (46.8)	25 (53.2)		
Supervision				
Supervisor background				
Community leader	68 (55.3)	55 (44.7)	1.444 (1)	0.229
Medical personnel	101 (62.3)	61 (37.7)		
Being supervised				
Yes	131 (66.8)	65 (33.2)	14.778 (1)	<0.001*
No	38 (42.7)	51 (57.3)		
Frequency (n=196)				
Once a week	19 (67.9)	9 (32.1)	12.389 (4)	0.015*
Once every 2 weeks	22 (88.0)	3 (12.0)		
Once every 3 weeks	11 (84.6)	2 (15.4)		
Once a month	66 (64.7)	36 (35.3)		
Once every few months	13 (46.4)	15 (53.6)		
Encouraged to work harder and more committed				
Yes	157 (65.1)	84 (34.9)	22.111 (1)	<0.001*
No	12 (27.3)	32 (72.7)		
Knowledge Level				
Good	89 (61.0)	57 (39.0)	0.342 (1)	0.559
Poor	80 (57.6)	59 (42.4)		
Motivation Level				
High	83 (76.1)	26 (23.9)	20.760 (1)	<0.001*
Low	86 (48.9)	90 (51.1)		
Job Satisfaction Level				
High	70 (79.5)	18 (20.5)	21.624 (1)	<0.001*
Low	99 (50.3)	98 (49.7)		

Note. df=degree of freedom; \*P-value <0.05; <sup>a</sup>Fisher's exact

Further analysis of independent variables with a *P*-value of <0.25 using Multiple Logistic Regression identified four significant predictors for the high-performance level (Table 3). Training duration, supervisor background, motivation, and job satisfaction. COMBI CHVs with one day or more of training were 14.6 times more likely to achieve high-performance than those with less than one training day (AOR=14.557, 95% CI=3.952,53.623, *P*<0.001). Those supervised by medical personnel were five

times more likely to perform highly than those supervised by community leaders (AOR=4.997, 95% CI=1.418,17.605, *P*=0.012). Additionally, CHVs with high motivation levels were 5.5 times more likely to have high-performance levels (AOR=5.538, 95% CI=1.598,19.192, *P*=0.007), and those with high job satisfaction levels were 4.5 times more likely to achieve high-performance (AOR=4.562, 95% CI=1.410,14.759, *P*=0.011).

**Table 3:** Factors associated with the high-performance level using Multiple Logistic Regression

<i>Variables</i>	<i>Adjusted Coefficient</i>	<i>SE</i>	<i>AOR</i>	<i>95% CI of OR</i>		<i>P-value</i>
				Lower	Upper	
Intercept	-4.829	1.705				
Age(yr)	0.053	0.029	1.055	0.997	1.116	0.065
Training Duration						
<1 day	Ref.					
≥1 day	2.678	0.665	14.557	3.952	53.623	<0.001*
Supervision Background						
Community leader	Ref.					
Medical personnel	1.609	0.643	4.997	1.418	17.605	0.012*
Motivation						
High	1.712	0.634	5.538	1.598	19.192	0.007*
Low	Ref.					
Job Satisfaction						
High	1.518	0.599	4.562	1.410	14.759	0.011*
Low	Ref.					

*Note.* SE=Standard error; AOR=adjusted odds ratio; CI=Confidence interval  
 Backward LR applied; No multicollinearity, assumption all met  
 Hosmer & Lemeshow (*P*=0.767), classification table (overall:85.7%), Cox & Snell R<sup>2</sup> (0.318),  
 Nagelkerke R<sup>2</sup> (0.471), ROC (0.865)  
 \**P*-value<0.05

## Discussion

The study achieved a 95% response rate, consistent with previous research (12,18). Collaboration with the Health Promotion and Education Division of JKWP&P and the Health Education Officers contributed significantly to the excellent response rate for this study.

The performance of COMBI CHVs in Kuala Lumpur and Putrajaya was assessed using a self-administered questionnaire based on program core activities, akin to past studies (3,11,12). The findings revealed that 59.3% of COMBI CHVs exhibited high-performance, while 40.7% showed low-performance. These findings align with studies highlighting variable CHV performance in different health programs (3,12,26). Only half performed well in their roles, indicating the need for further investigation and interventions to enhance their effectiveness.

Most respondents in this study were female, Malay, with at least tertiary education, married, and part of the working population. The mean age was  $47.57 \pm 11.09$  years, and the median monthly household income was RM3000 (IQR 4000), representative of COMBI CHVs in Kuala Lumpur and Putrajaya. However, sociodemographic factors were not significantly associated with performance level, consistent with Sondaram et al. (2018) but differing from Chung et al. (2017) (12,18). These outcomes emphasise the need to consider multiple factors, including knowledge, motivation, training, job satisfaction, and cultural context, in understanding CHVs' performance dynamics (12,18,27,28).

Caution is necessary to prevent unintentional biases when interpreting results. Limited research exists on the impact of ethnicity on CHVs' performance in Malaysia, a diverse country. Kuala Lumpur comprises approximately 48.2% Bumiputera, 41.1% Chinese, 10.0% Indians, and 0.7% others, while Putrajaya consists of approximately 98.0% Bumiputera, 0.5% Chinese,

1.2% Indians, and 0.3% others (29). However, this study primarily consists of Malay respondents (96.8%), aligning with previous local studies (18,30).

Training factors, including experience, duration and adequacy, are significantly associated with COMBI CHVs' performance level, consistent with previous studies indicating that CHVs with more comprehensive training tend to perform better (31). Effective training is crucial for enhancing knowledge and skills, as CHVs who never attended training or found it inadequate tend to underperform (5,16). The training location, whether community-based or government-based, did not significantly affect performance, unlike a study in Sarawak, where geographical challenges played a role (12). Sarawak, the largest state in Malaysia, has scattered communities that pose difficulties due to long travel distances, limited transportation, and infrastructural issues, while Kuala Lumpur and Putrajaya's urban settings and smaller territories provided better training accessibility (32). It is important to note that this study did not specify exact training locations or distances from CHVs' residences.

Supervision factors, such as being supervised, frequency, and encouragement received, are significantly associated with COMBI CHVs' performance. However, this study found no significant association between the supervisor's background and performance, in contrast to previous findings highlighting the supervisor's background's impact (12,33). Kawakatsu et al emphasised the role of supervision quality, particularly the interaction between supervisor background and supervision frequency, in enhancing CHVs' performance (33).

Although respondents with good knowledge had a higher prevalence of high-performance levels among COMBI CHVs, this study found no significant association between knowledge and performance, unlike Watanabe et al (14). This difference may stem from the influence of factors

beyond knowledge, including education, ethnicity, income, employment, training, and supervision (27,28,33). Higher education levels may aid in knowledge acquisition and enhance performance. However, while knowledge is crucial, it only sometimes guarantees better health-related practices and performance (33).

Motivation is significantly associated with COMBI CHVs' performance, with high motivation predicting high-performance, consistent with previous research highlighting motivation's importance (12,14,15). Motivation can be intrinsic (personal desires) or extrinsic (external rewards) (34). It is closely intertwined with resilience, aiding in overcoming challenges (35,36). Both motivation and resilience are vital for performance (34). 61.8% of respondents in this study's low motivation levels may be influenced by factors like age, gender, income, and culture (37). Lack of motivation and insufficient community or family support adversely affect CHVs' performance (5).

Job satisfaction in this study is significantly associated with performance levels, aligning with previous studies (14,38,39). Satisfied workers tend to possess better knowledge, competence, innovation, and goal achievement (39). High job satisfaction predicts high performance in respondents. However, factors like increased workload, high expectations, uneven responsibilities, lack of recognition, and emotional or psychological challenges contributed to low job satisfaction (28,40). Conversely, low job satisfaction due to working environment and organisational management can lead to burnout and increased turnover intentions, indirectly affecting performance (40).

In this study, training duration, supervisor background, motivation and job satisfaction predicted highperformance among COMBI CHVs. CHVs with one or more training days were 14.6 times more likely to have high-performance, consistent with previous studies indicating that more extended training improves CHVs' knowledge, skills, confidence and commitment (31). Supervision by medical personnel increased the likelihood of high-

performance fivefold, differing from Chung et al.'s findings (12). Ministry of Health supervisors offers more guidance, and support, improving CHVs' performance and coordination (33). High motivation boosted the odds of high-performance by 5.5 times, consistent with previous studies (12,14,15). It improves CHVs' attitude, enthusiasm, and dedication to the program (34–36). Similarly, high job satisfaction increased the odds of high-performance by 4.5 times, in line with previous research, promoting better knowledge and competence (14,38,39).

Despite limitations like limited generalizability to other regions in Malaysia, potential response or recall biases, and challenges in establishing temporal causal relationships among the investigated factors, this study addressed a research gap, particularly within the COMBI program context. These findings can provide valuable insights and recommendations for developing evidence-based policies and strategies to enhance COMBI CHVs' performance. This, in turn, can lead to more efficient healthcare delivery and improved CHV retention, especially in urban areas like Kuala Lumpur and Putrajaya.

## **Conclusion**

The study identifies key predictors of high performance among COMBI CHVs in Kuala Lumpur and Putrajaya, including training, supervision, motivation, and job satisfaction. These findings can guide improvements in training, supervision, and recognition mechanisms to enhance the program's effectiveness in dengue disease reduction and prevention. Future research should explore CHV motivations and challenges using qualitative and longitudinal approaches.

## **Journalism Ethics considerations**

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission,



redundancy, etc.) have been completely observed by the authors.

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## Conflict of Interest

Non-declared.

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