

# The role of self-determination theory in investigating factors that contribute to performance in active malaria case surveillance among female community health volunteers in high-endemic areas of Nepal

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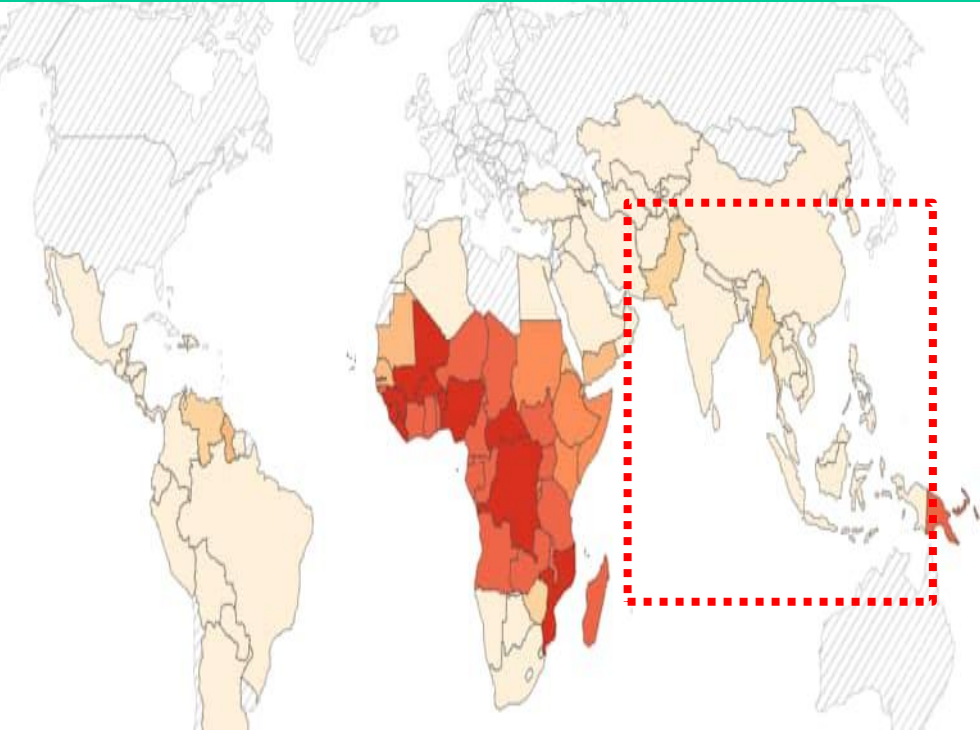
## Outline of the presentation

- 1. Background & Objective**
- 2. Methodology**
- 3. Results**
- 4. Conclusion and Takeaway messages**

# Background & Objective



# Malaria is a life-threatening disease, remains a significant public health challenge in endemic regions



**83**

**Endemic**  
countries around the world

**50%**

of **World's**  
population  
at risk (3.3 billion)

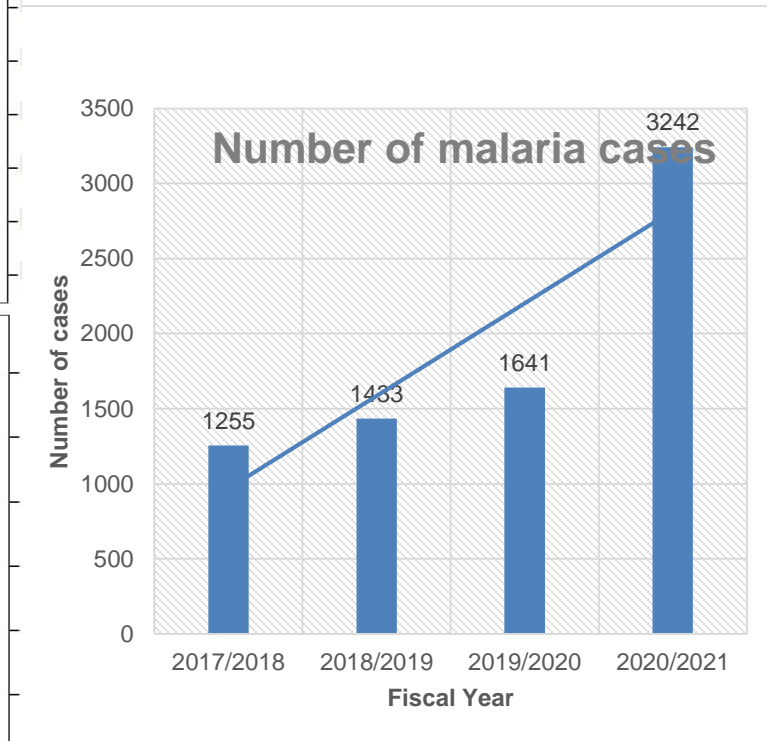
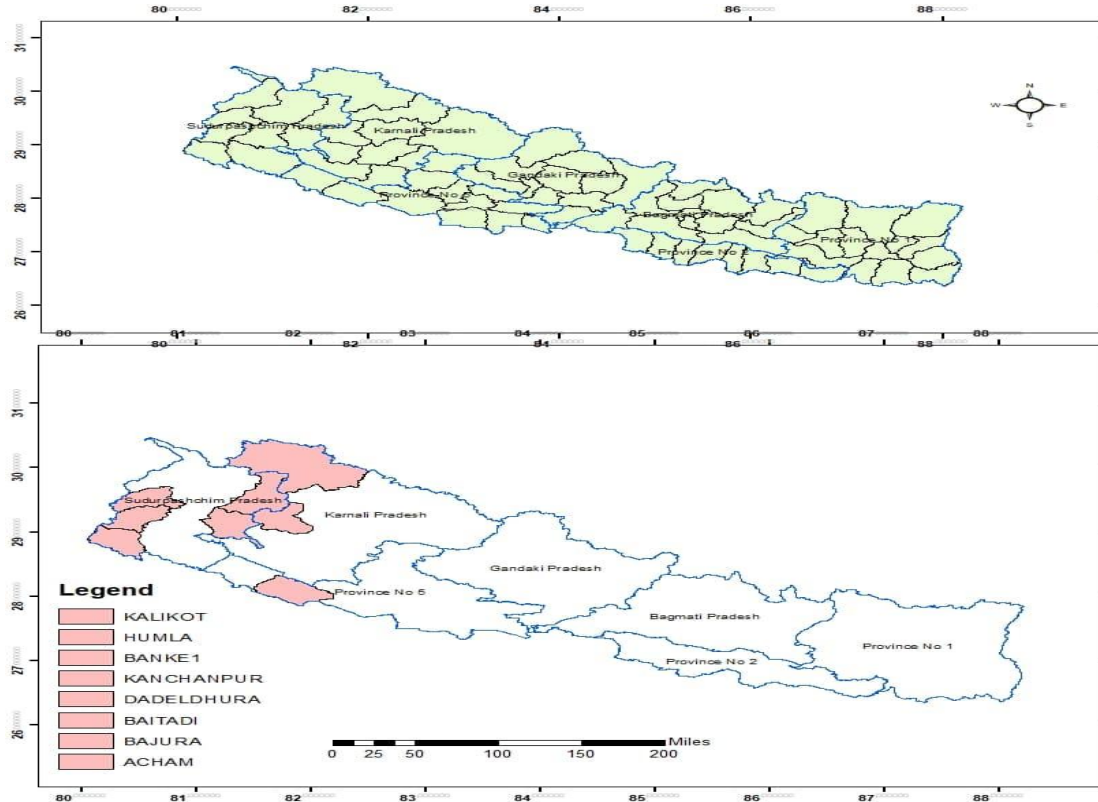
**48%**

of current global malaria burden  
are **SEA** population (1.6 billion)

WHO. (2024). World Malaria Report.

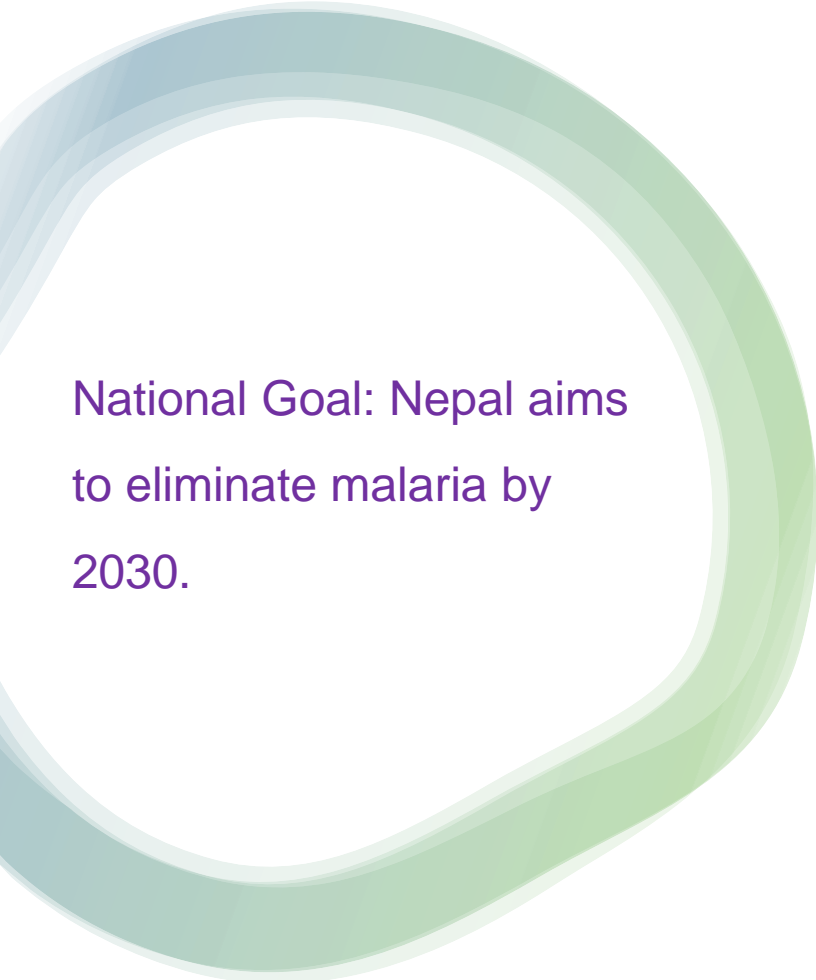


# Increasing malaria cases in the endemic areas of Nepal



90% of cases accumulated in endemic regions(Dahal, et. al. 2020).

# Strategic plan for Malaria disease control in Nepal



National Goal: Nepal aims to eliminate malaria by 2030.

- The Nepal government has made efforts to malaria control techniques and strategies under the national malaria elimination by 2030 AD.



- One of the most notable approaches is FCHV engagement within the community health strategy models in active malaria surveillance
- FCHVs: 17000 out of 50,000 female volunteers trained to deliver basic healthcare, including malaria surveillance in endemic regions.

(Department of Health Service, Annual Health Report, 2020)

# Seven Roles of FCHVs in Endemic Malaria Areas



1. Diagnosis of cases



2. Treatment of cases



7. Recording and reporting the cases.



3. Referring to the cases

6. Observation (home visit) usage of LLIN



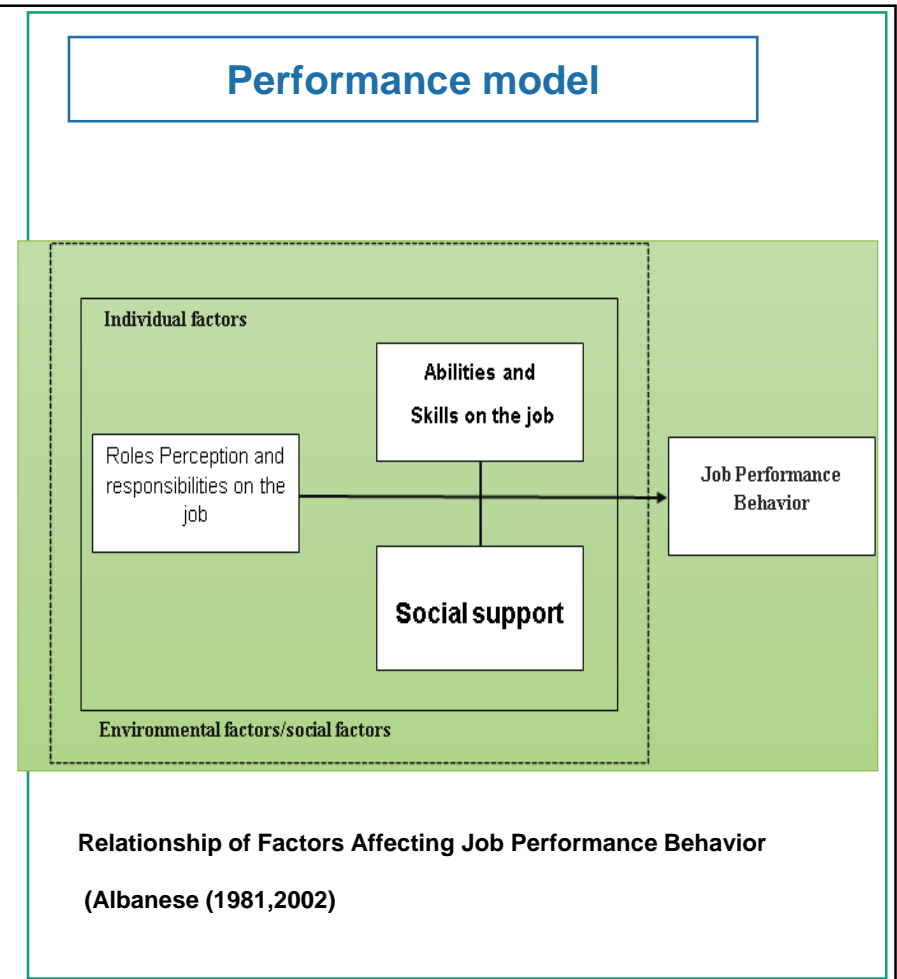
4. Transferring knowledge



5. Distribution of IEC materials

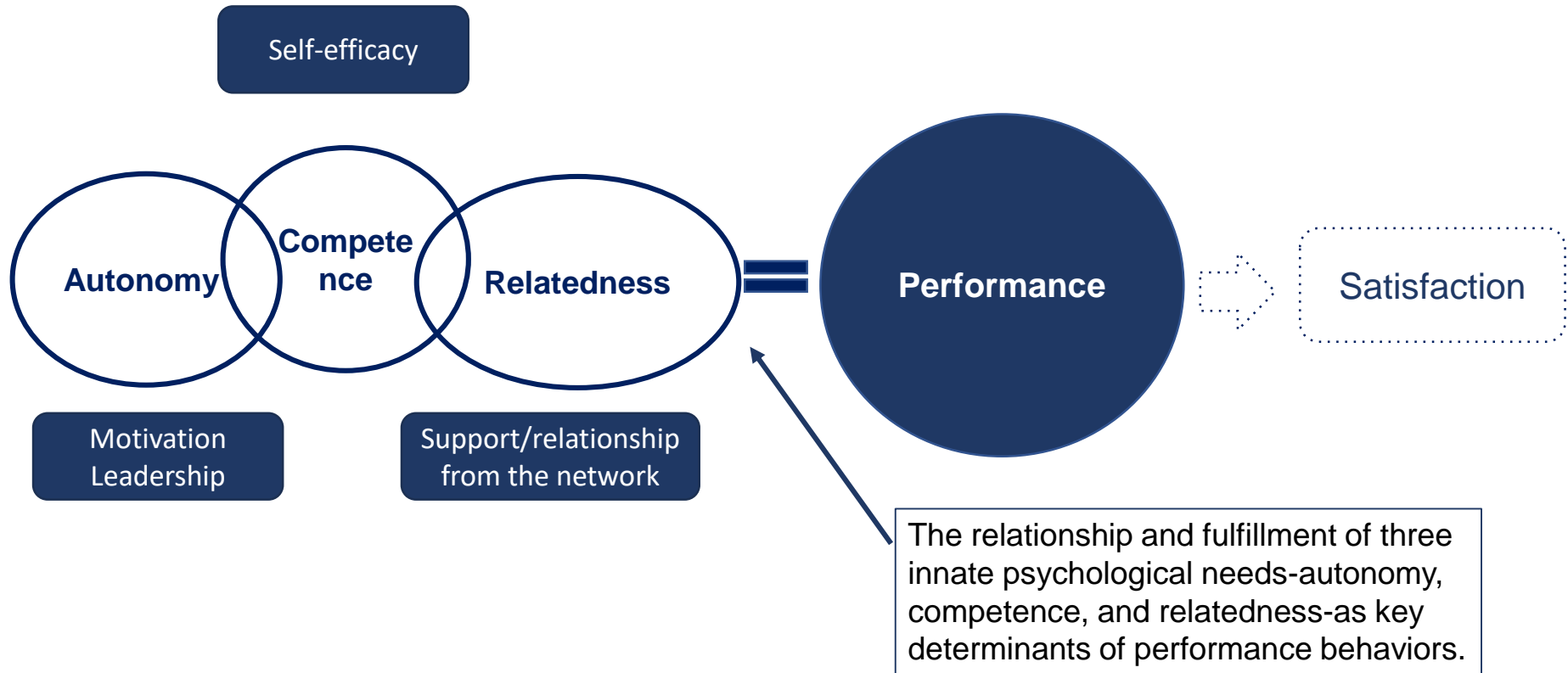
# A framework of individual performance

- The individual's competencies, including their knowledge, confidence, and skills are a major determinant of job performance (Chipukuma, Zulu et al. 2018).
- Social support in the workplace, including adequate supervision, feedback, and collaboration with other members, enables individuals to effectively apply their competencies on the job (Liu, Yang et al. 2022).
- Multifaceted capacity-building approaches including training are recommended to optimize CHV performance.



A theory of job performance in an organization (Campbell 1993, 2001)

# The performance Framework by Self-Determination from the theoretical level



(Gagne & Deci (2005), Self-determination theory and work motivation. J. Organiz. Behav., 26: 331-362.

# Research Gap

1. There are still gaps in our knowledge about the baseline information about performance, including **psychological and personality factors** influencing the effectiveness of FCHVs in malaria surveillance (Hester et al., 2022).
2. Research on psychological factors, such as **motivation and self-efficacy**, and personality factors such as leadership among FCHVs in Nepal have **not been assessed** and mostly in endemic areas, such as the north-western (Panday, Bissell, Van Teijlingen, & Simkhada, 2017; Sharma, 2024).
3. No research has analyzed the **causal structural equation framework model and testing hypothesis** between autonomy, competence, and relatedness constructs and performance in the context of low- and middle-income countries, not just Nepal (Chipukuma et al., 2018; Kok et al., 2015) in active malaria case surveillance activities.

# Research Objectives



## General Objective

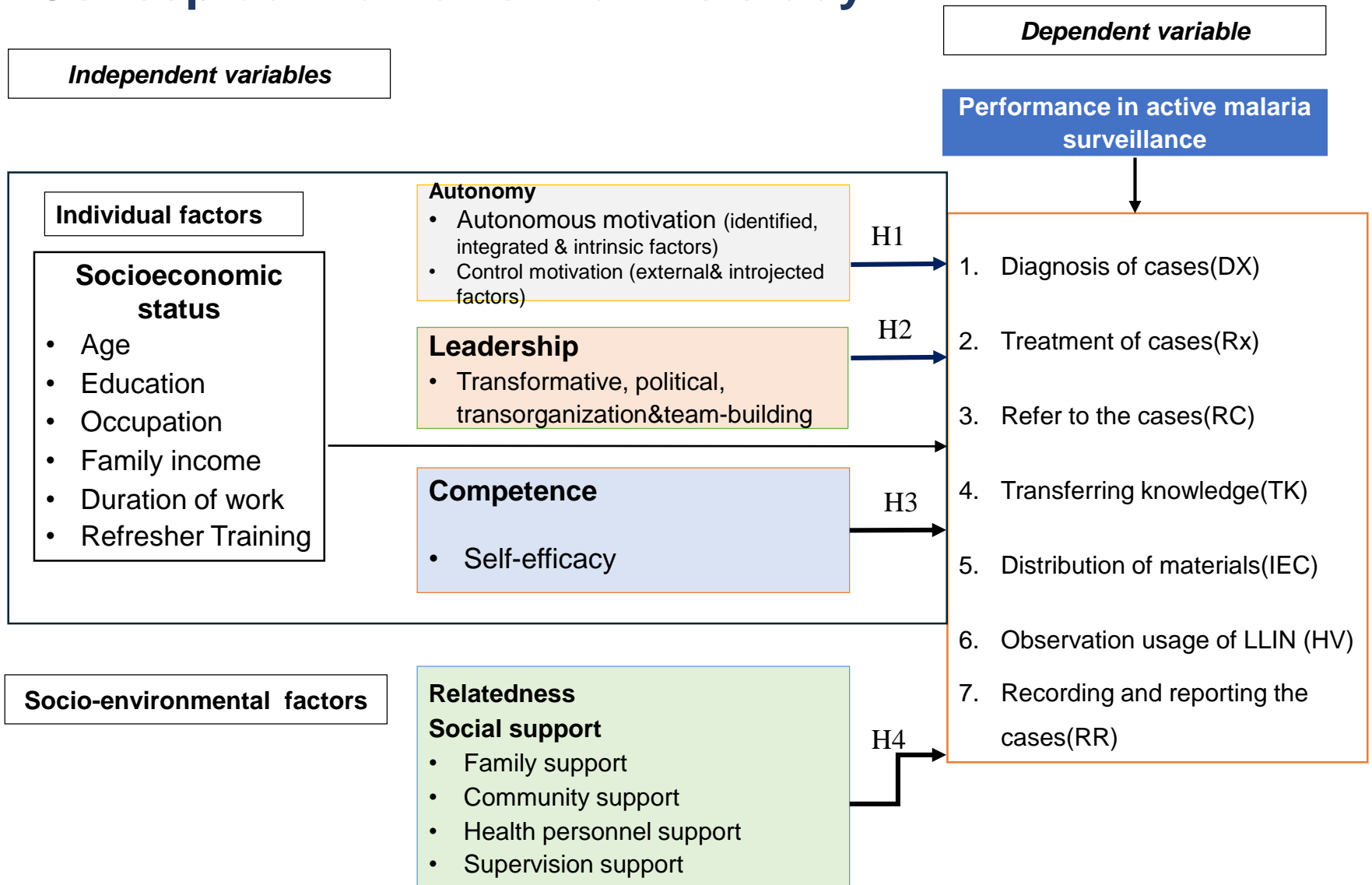
- ✓ To assess the performance and analyze the causal relationship model in determining the performance in active malaria case surveillance of female community health volunteers in the high-endemic areas of Nepal.



## Specific Objectives

- ✓ To assess the performance of female community health volunteers in active malaria case surveillance in the high-endemic areas of Nepal.
- ✓ To describe the perceived motivation, leadership skills, self-efficacy, social support, and socioeconomic factors of female community health volunteers in active malaria case surveillance in the high-endemic areas of Nepal.
- ✓ To determine the association between motivation, leadership skills, self-efficacy, social support, and socioeconomic factors in the performance of female community health volunteers in active malaria case surveillance in the high-endemic areas of Nepal.
- ✓ To analyze the causal relationship model in determining the performance in active malaria case surveillance of female community health volunteers in the high-endemic areas of Nepal.

# Conceptual framework of the study



# Research Methodology

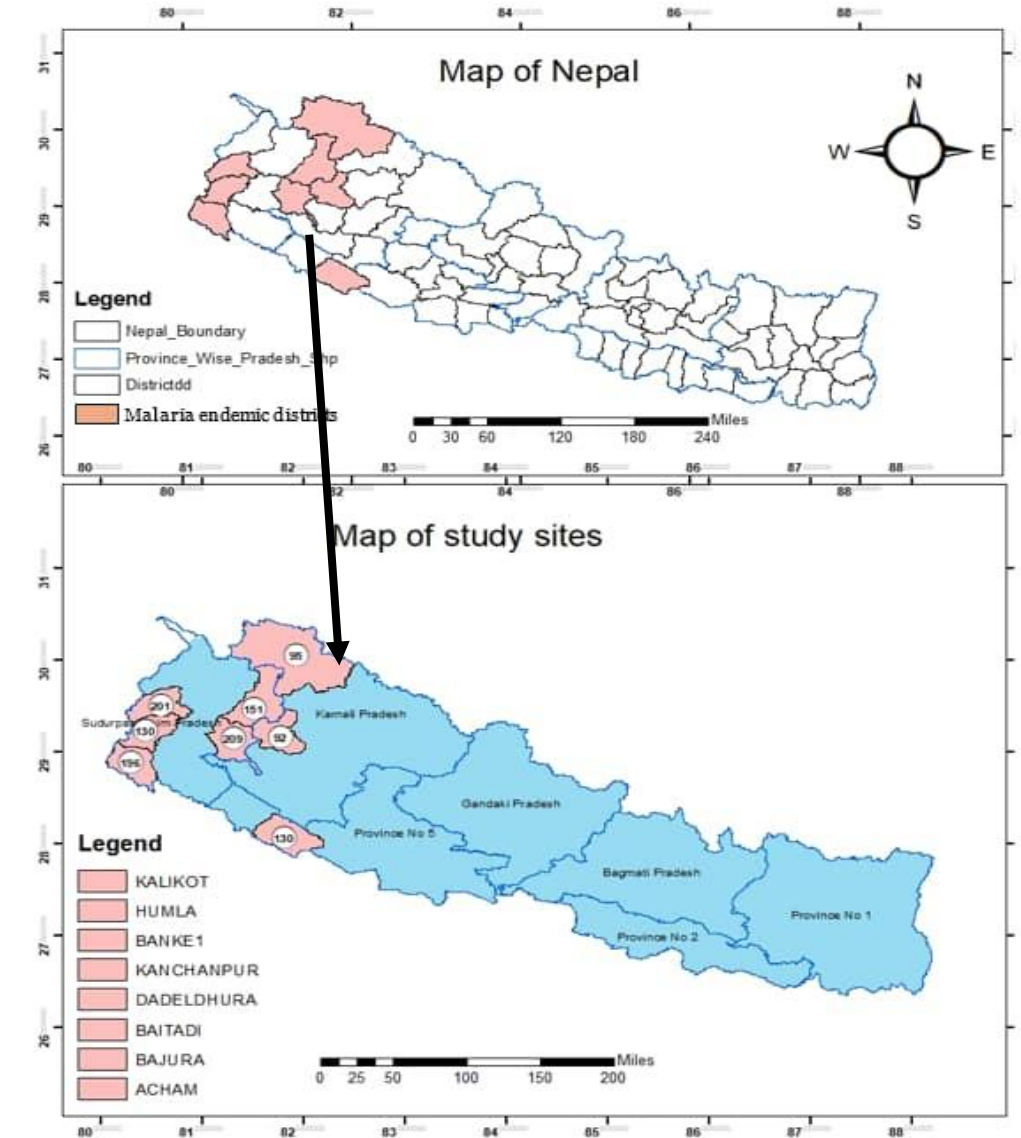
**Study Design:** A cross-sectional, Quantitative Method

**Study Population:** Female Community Health Volunteers working in high endemic areas of Nepal for 1 year

**Sample size and sampling technique:** Sample Size :  $1094 + 10 \% = 1204$   
Simple random sampling and Probability-proportional-to-size sampling

# Study settings

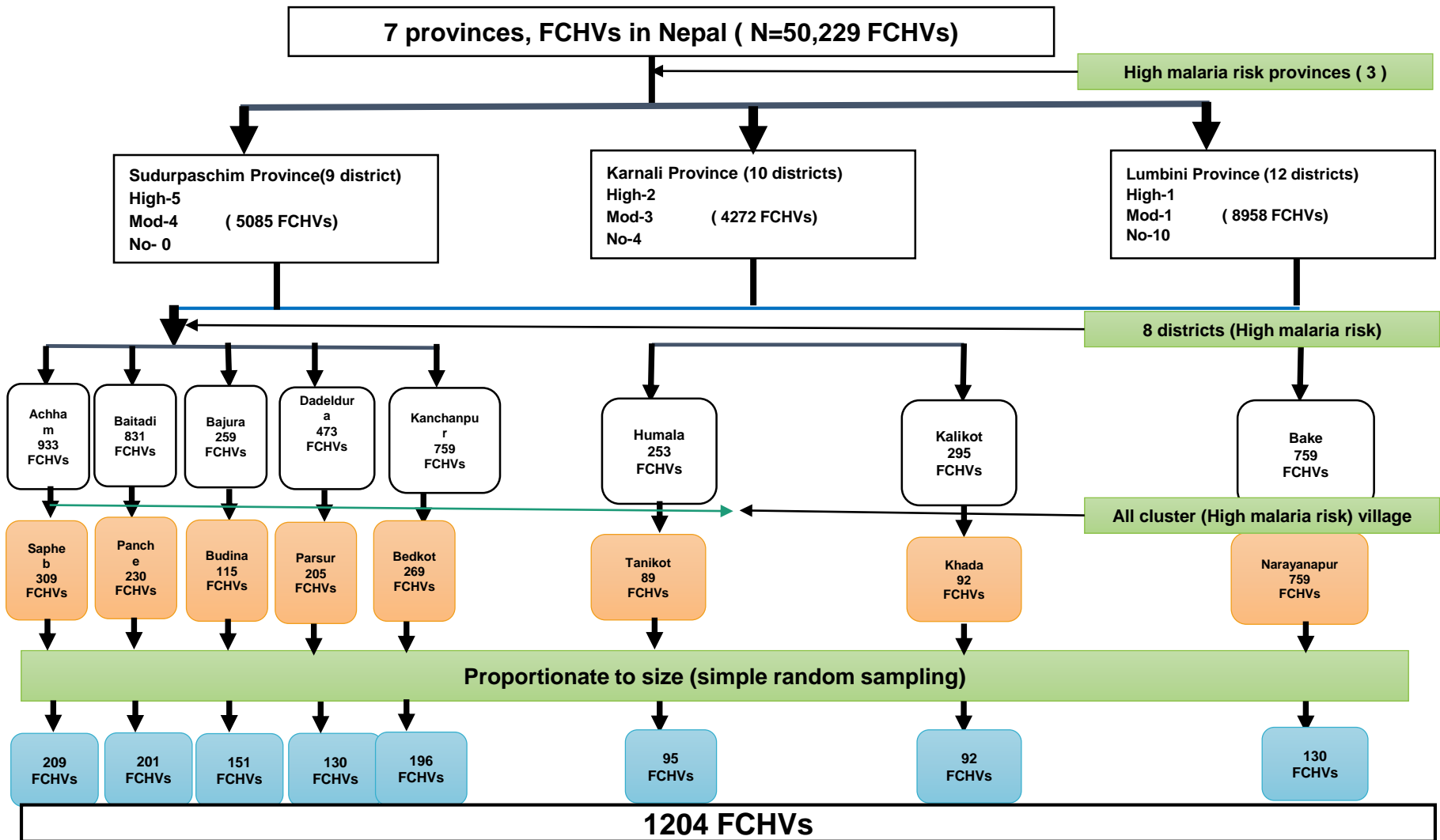
- Malaria risk areas as Microstratification 2020.
- Based on the annual parasite incidence (API), high-risk districts (API  $\geq 1$ ).



# Inclusion and exclusion criteria of the study participants

<b>INCLUSION CRITERIA</b>	<ul style="list-style-type: none"><li>✓ FCHVs working in high-risk malaria districts for 1 year.</li><li>✓ Age between 25-60 years</li><li>✓ Sample frame of volunteers, who were willing to participate, and can provide information</li></ul>
<b>EXCLUSION CRITERIA</b>	<ul style="list-style-type: none"><li>✓ The FCHVs, who had been seriously ill, cannot communicate verbally, and are on leave at the time of data collection were excluded from this study</li></ul>

# Sampling techniques



# Survey questionnaire items

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**Part 1: Socioeconomic status -6 items- Fill in blanks/open types**

**Part 2: Work motivation- 2 components ( 20-items)-5-point Likert scale ( 1 SD to 5 SA)**

**Part 3: Leadership – 4 dimensions-12 items-5-point Likert scale ( 1 SD to 5 SA)**

**Part 4: Self-Efficacy- 10 items- 5-point Likert scale ( 1 SD to 5 SA)**

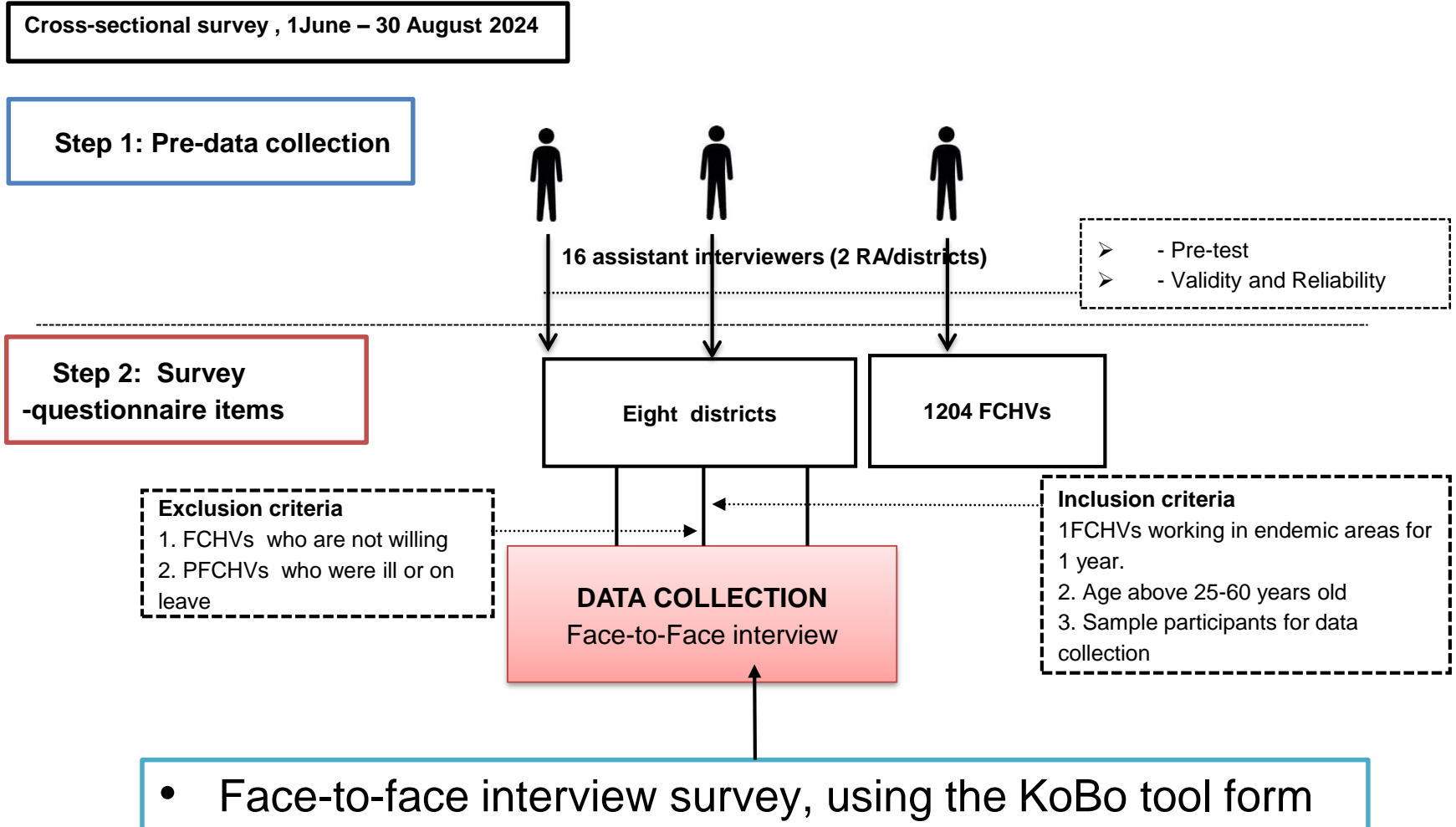
**Part 5: Social Support – 5 components ( 15 items and 6 items)- 5points Likert scale ( 1 Never to 5 Aways)**

**Part 6: Performance in active malaria case surveillance- 7 dimension- 21 items**

# Reliability of the instrument

- ✓ 0.866 (motivation at work scale scale)
- ✓ 0.694 (leadership scale)
- ✓ 0.797 (self-efficacy scale)
- ✓ 0.649 (social support scale)
- ✓ 0.823) (supervision scale)
- ✓ 0.678 (performance scale)

# Data collection procedure



# Statistical analysis

- ✓ Used IBM SPSS Version 26.0 for analysis, Descriptive statistics, reliability, and test of association and correlation (p=value <0.05).
- ✓ Used IBM SPSS AMOS 29.0 graphic for confirmatory factor analysis (CFA) to validate all study variables performed to test the scales' construct and discriminant validity with fitting indexes such as  $\chi^2/df$ , GFI, CFI, TLI, RMSEA, and RMR.
- ✓ Finally, the hypothetical model relationship was evaluated via structural equation modeling (SEM) analysis.

# Ethical consideration

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**Ethical Review Committee, Mahidol University, and NHRC Nepal** and approved with certificate approval number 2024/132.0104 (MU-CIRB)  
(ERB-NHRC-approval no.034-2025)

A written informed consent with their signature was taken from the respondents after their volunteer willingness to participate in this study

Collected data were informed consent, kept confidentially, and will be destroyed after the completion of the study.

# **3. Results and Discussion**

# Descriptive analysis

## Socio-economic variables

**45.9%** of the FCHVs  
in middle-aged (35-44  
years)

(Mean = 40.92, SD = 10.17,  
Min = 25, Max = 60.0)

**44.9%** completed  
primary-level  
education

**58.2%** engaged in  
agriculture as major  
occupation

**44.1%** worked 6-10  
years as FCHVs

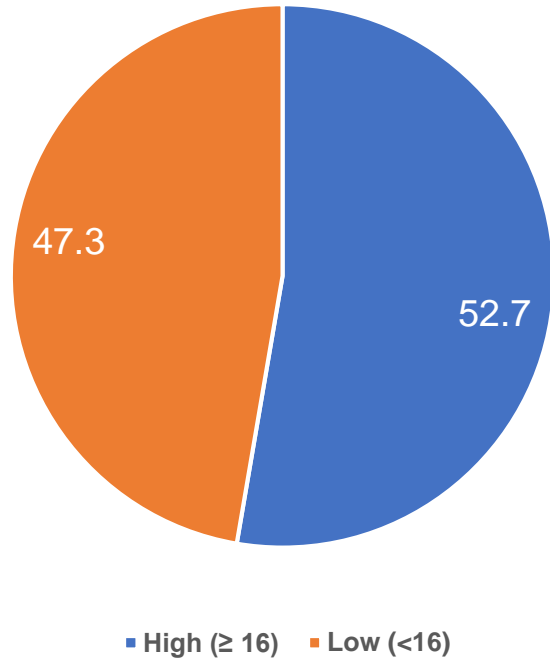
**69.9%** had less than  
15000 rupees (monthly  
income)

**64.1%** had 1-5 years  
of experience as  
Malaria volunteers

n=1204

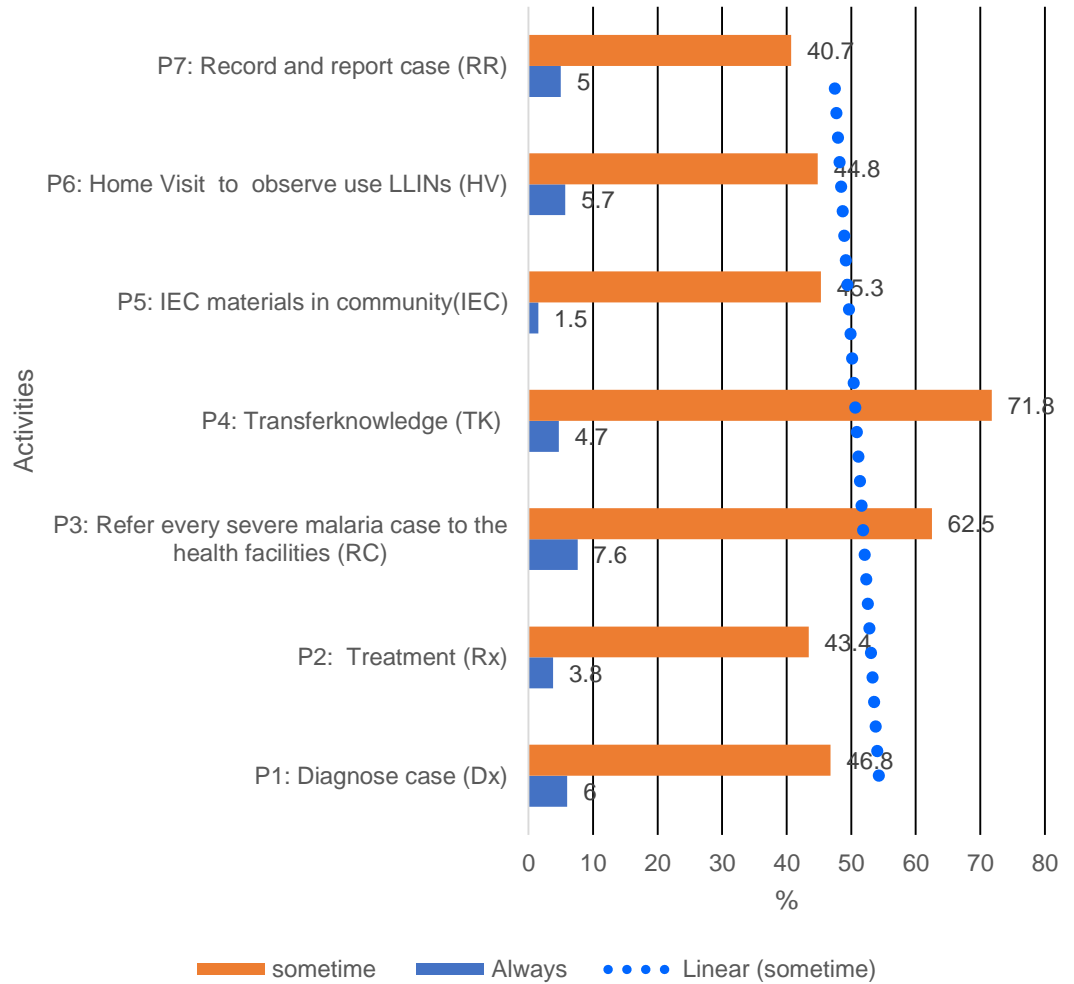
# Performance in active malaria case surveillance in FCHVs.

Performance level



Performance level among FCHVs (n=1204)

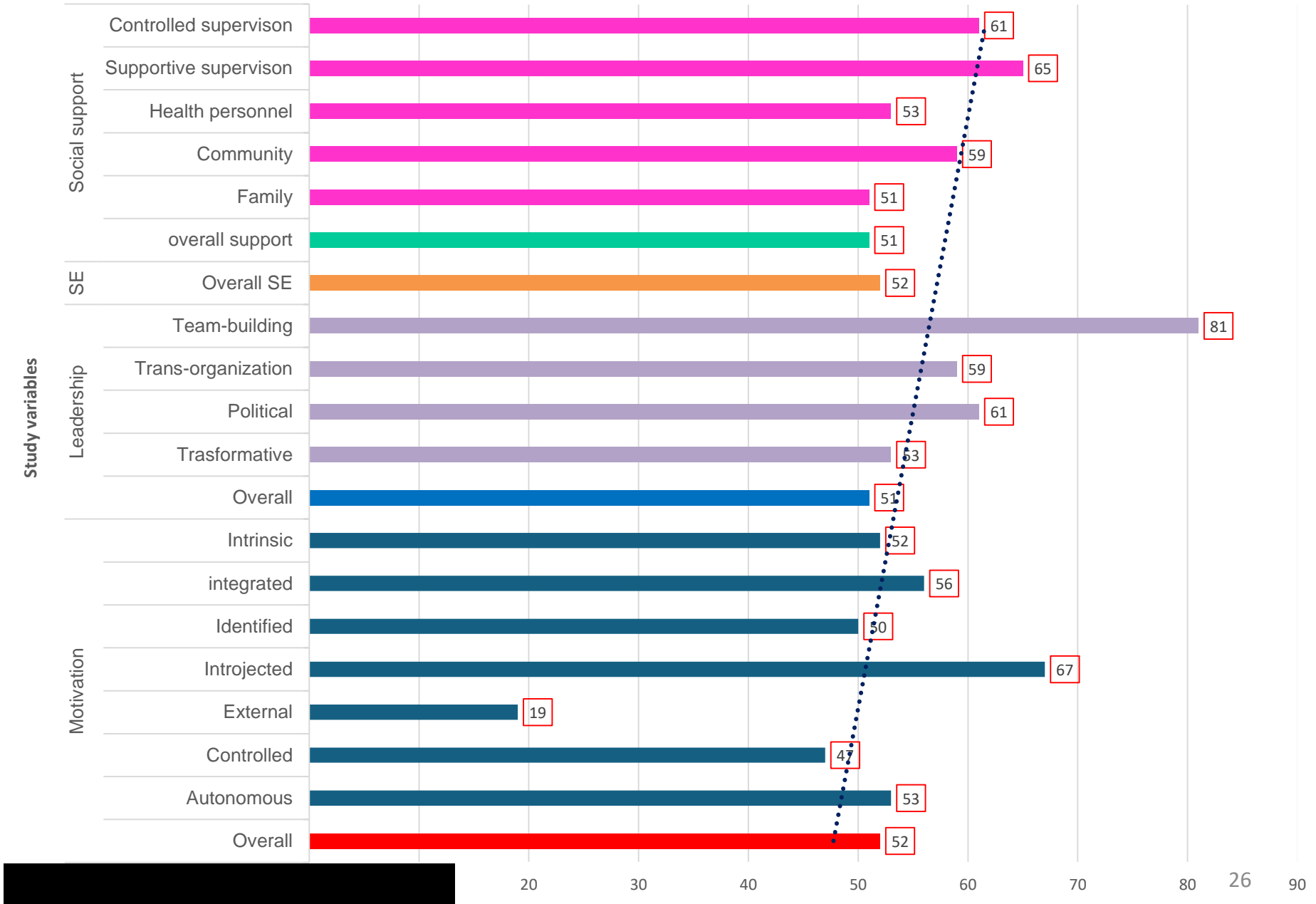
A high-level performance was reported by **52.7%** of FCHVs (Median  $\geq 16$ ).



## Research on performance in CHVs using key indicators:

- 64% in Thailand (Yaebkai & Wongsawat, 2022)
- 53.6% in Myanmar (Thiha, Aung, 2021),
- 38.6% in Laos (Phommanivong, 2010)
- 37.8% In Kenya (Otambo et al., 2023)

# Score levels of Work Motivation, Leadership, SE & Social Support



## Results: Chi-square analysis (test association among independent factors to performance)

Dependent variable: performance  
High-low

Socio-economic factors	Chi-square value	P-value
<b>1. Age groups</b> 25-44 years 45-60 years	10.66	<b>&lt; .001</b>
<b>2. Major occupation</b> Agriculture Traders/business Private empolowee	16.50	<b>&lt; .001</b>
<b>3. Work experience as malaria volunteers</b> <5 years >_5Years	20.95	<b>&lt; .001</b>
<b>4.Receiving refresher training</b> Yes no	16.60	<b>&lt; .001</b>

Older age (46-60 years) were associated with high performance

Major occupation others than agriculture were associated with high performance

More years of experience as malaria work were associated with high performance

Refresher training attainment in past years were associated with high performance

Level of education, and experience as FCHV factors were NOT found to be significantly associated.

**Results: Chi-square test**  
 (test association among independent factors to performance)

Dependent variable: performance  
 High-low

Factors	Chi-square value	P-value
<b>Autonomous motivation (intrinsic)</b>	229.55	<b>&lt;.005</b>
<b>Controlled motivation (external regulation)</b>	72.97	<b>&lt;.005</b>
<b>Transformative leadership</b>	76.95	<b>&lt;.005</b>
<b>Political leadership</b>	36.86	<b>&lt;.005</b>
<b>Team building leadership</b>	29.82	<b>&lt; .001</b>
<b>Self-efficacy</b>	29.82	<b>&lt; .001</b>
<b>Family support</b>	23.37	<b>&lt;.005</b>
<b>Health personnel support</b>	8.52	<b>&lt;.005</b>

High intrinsic and low extrinsic motivation associated with high performance

Transformative leadership associated with high performance

Political leadership was associated with performance

Team building leadership was associated with performance

High self-efficacy was associated with high performance

High family support was associated with high performance

Health personnel support was associated with high performance

# Confirmatory factors analysis (measurement model) and SEM

(Constructs and items validation and causal model to determine performance)

- The measurement model, relationships between the observed indicators variables and underlying constructs to measure unobserved latent variables.
- This study had four measurement variables: autonomy motivation, leadership, self-efficacy, and social support.
- The indicator loadings for statistical significance were tested by t-values that exceeded the critical value of  $\pm 1.96$  for 0.05 significant levels.
- The squared multiple correlation ( $R^2$ ) or variance extracted was used to detect the item reliability with the acceptable suggestion at the threshold level of .50 or higher

<u>Measurement model</u> <u>Fit indices</u> <u>Standard criteria</u>	<u>X2/DF</u>	<u>GFI</u>	<u>AGFI</u>	<u>CFI</u>	<u>TLI</u>	<u>RMSE</u>	<u>SRMR</u>	<u>Good fit</u>
	<u>&lt;5</u>	<u>&gt;95</u>	<u>&gt;95</u>	<u>&gt;95</u>	<u>&gt;95</u>	<u>&lt;0.08</u>	<u>&lt;0.06</u>	

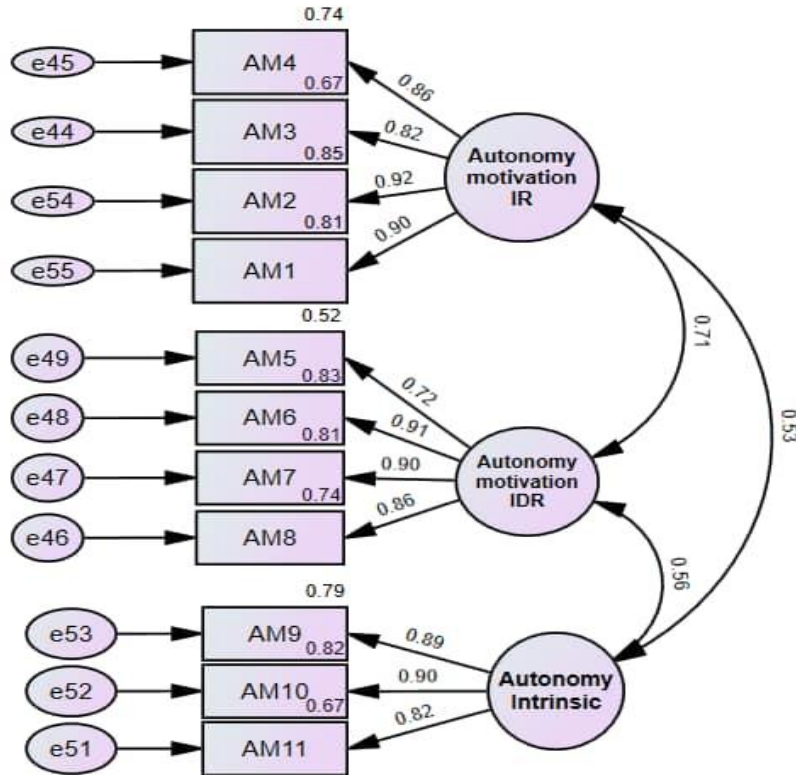
**Factor Loadings (>0.6) CR (>0.7) AVE ( $\geq 0.5$ ) Cronbach's Alpha (>0.7)**

Fornell C, Larcker DF(1981), Mw, B. (1993). "Alternative ways of assessing model fit." Testing structural equation models, (Ullman and Bentler 2012), Bagozzi and Yi 2012).

Janmaimool P. 2024

# Measurement Model of Autonomous Motivation

Figure : Measurement model of autonomy motivation ( 3construct-9items)



The fit indices, including  $\chi^2$  (<5), GFI, AGFI, CFI, TLI (>.95), RMSEA (<0.08), and SRMR, consistently indicate a good fit across all models (Ullman and Bentler 2012)

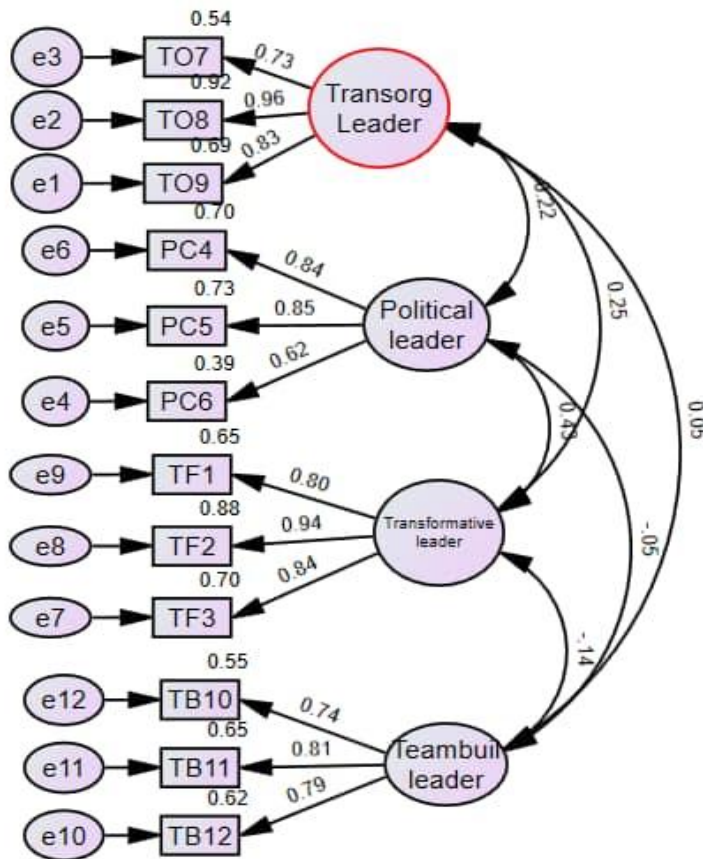
Cronbach's Alpha (0.934) and Composite Reliability (0.945) values confirm that the autonomy motivation construct is highly reliable and internally consistent. Additionally, The AVE value of 0.721 demonstrates strong convergent validity, meaning the construct effectively captures the variance in its items. (Bagozzi and Yi 2012).

$\chi^2/df$  (CMIN/DF) = 3.568, GFI = 0.987, CFI = 0.993, TLI = 0.988, RMR = 0.013, and RMSEA = 0.046

Factor Loadings (>0.6) CR (>0.7) AVE ( $\geq 0.5$ ) Cronbach's Alpha (>0.7)

# Measurement model of Leadership

Figure : Measurement model of the leadership ( 4 construct-12 items)



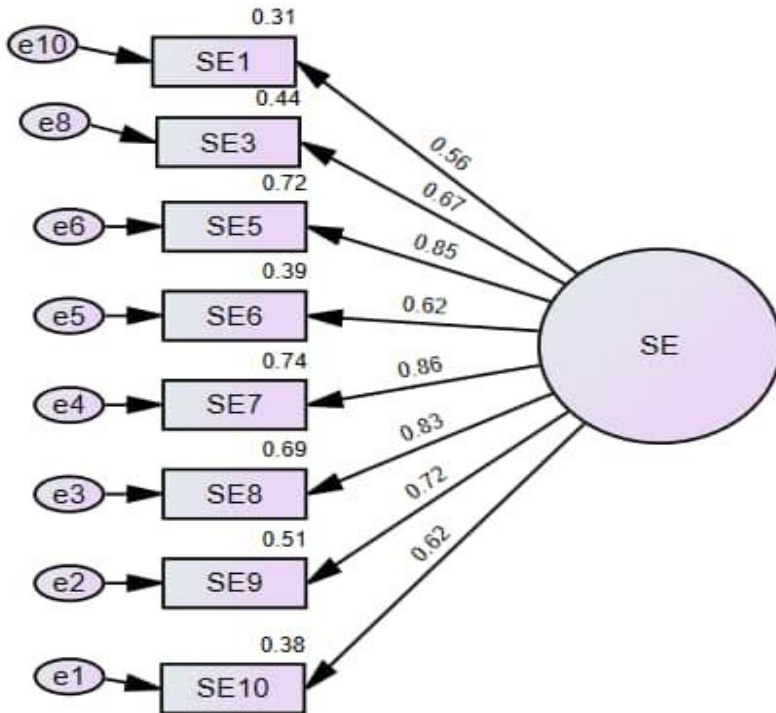
The fit indices, including  $\chi^2$  (<5), GFI, AGFI, CFI, TLI (>.95), RMSEA (<0.08), and SRMR, consistently indicate a good fit across all models (Hu and Bentler 1999)

Cronbach's Alpha (0.934) and Composite Reliability (0.945) values confirm that the leadership construct is highly reliable and internally consistent. Additionally, The AVE value of 0.69 demonstrates strong convergent validity, meaning the construct effectively captures the variance in its items. (Bagozzi and Yi 2012).

$\chi^2/df$  (CMIN/DF) = 3.97, GFI = 0.97, CFI = 0.98, TLI = 0.97, RMR = 0.026, RMSEA = 0.050

# Measurement model of Self-efficacy

Figure : Measurement model of the self-efficacy ( 1 construct-6 items)



The fit indices, including  $\chi^2$  (<5), GFI, AGFI, CFI, TLI (>.95), RMSEA (<0.08), and SRMR, consistently indicate a good fit across all models (Ullman and Bentler 2012)

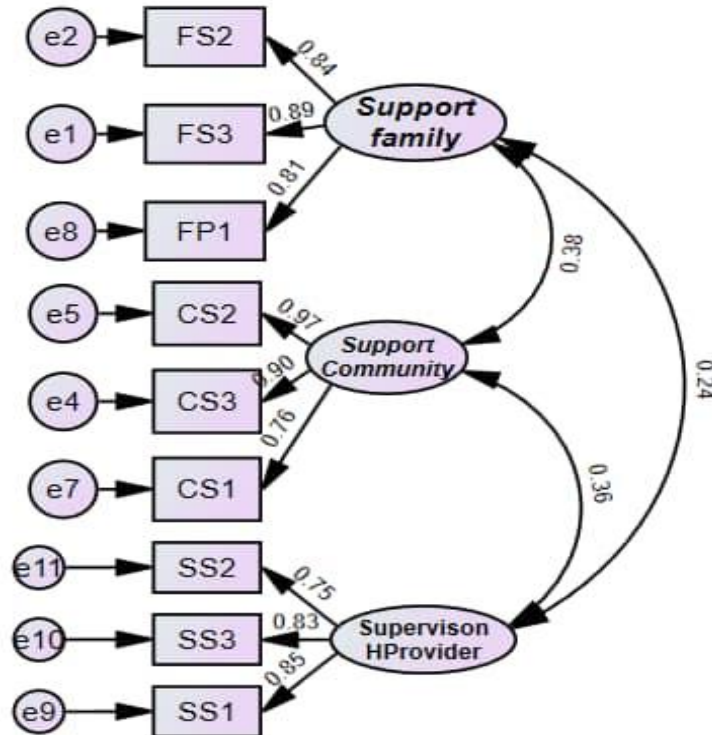
Cronbach's Alpha (0.934) and Composite Reliability (0.945) values confirm that the SE construct is highly reliable and internally consistent. Additionally, The AVE value of 0.69 demonstrates strong convergent validity, meaning the construct effectively captures the variance in its items. (Bagozzi and Yi 2012).

$\chi^2/df$  (CMIN/DF) = 1.253, GFI = 0.998, CFI = 0.999, TLI = 0.996, RMR = 0.006, and RMSEA = 0.014.

Factor Loadings (>0.6) CR (>0.7) AVE ( $\geq$ 0.5) Cronbach's Alpha (>0.7)

# Measurement model of Social support

Figure : Measurement model of the Social support ( 3 construct-9 items)



The fit indices, including  $\chi^2$  (<5), GFI, AGFI, CFI, TLI (>.95), RMSEA (<0.08), and SRMR, consistently indicate a good fit across all models (Hu and Bentler 1999)

Cronbach's Alpha (0.92) and Composite Reliability (0.93) values confirm that the leadership construct is highly reliable and internally consistent. Additionally, The AVE value of 0.68 demonstrates strong convergent validity, meaning the construct effectively captures the variance in its items. (Bagozzi and Yi 2012).

$\chi^2/df$  (CMIN/DF) = 3.592, GFI = 0.985, CFI = 0.989, TLI = 0.984, RMR = 0.026, and RMSEA = 0.046

# Results of Correlation Analysis among Constructs

Construct	Autonomy Motivation	Leadership	Self-Efficacy	Social Support	Performance
Autonomy Motivation	<b>0.849</b>	0.62	0.58	0.55	0.64
Leadership	0.62	<b>0.835</b>	0.67	0.61	0.70
Self-Efficacy	0.58	0.67	<b>0.742</b>	0.59	0.66
Social Support	0.55	0.61	0.59	<b>0.825</b>	0.60

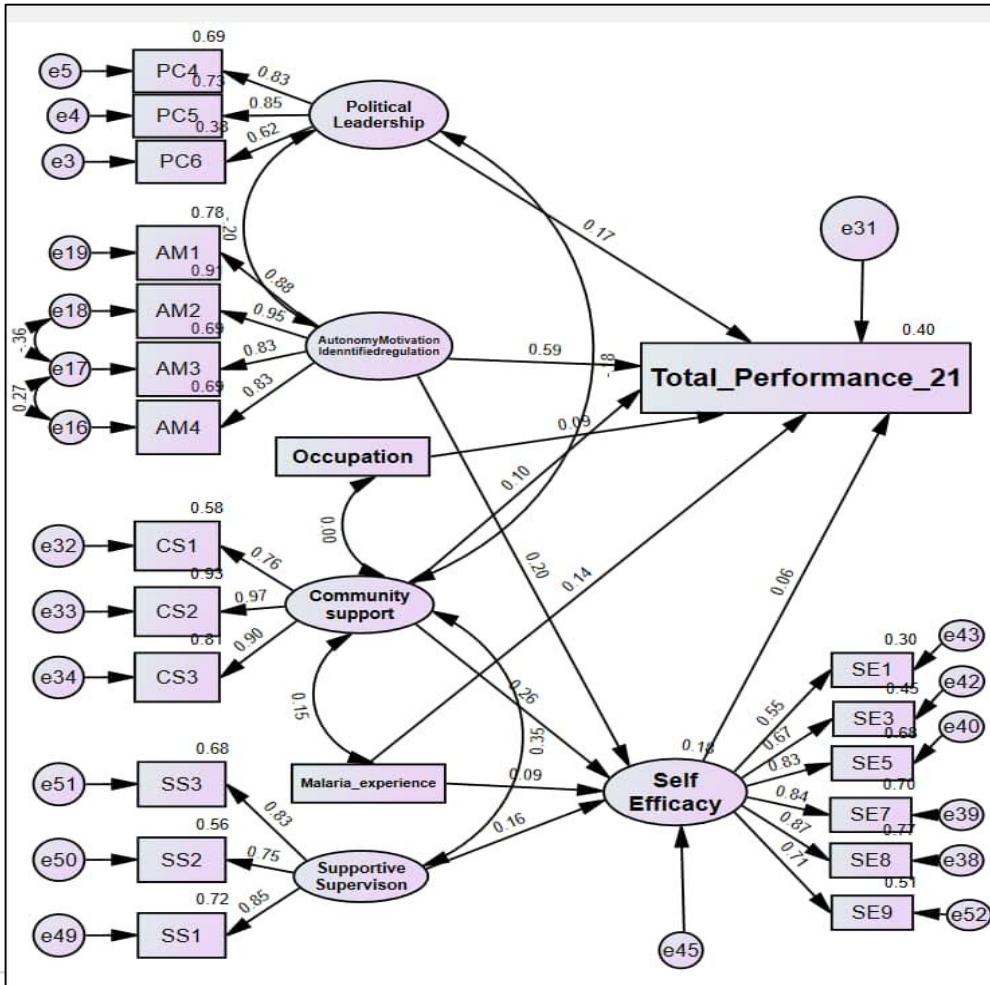
Diagonal Values (**Bold**): square root of AVE and Off-Diagonal Values: Represent the correlation coefficients between the constructs.

Autonomy Motivation:  $\sqrt{0.721} = 0.849$ , Leadership:  $\sqrt{0.698} = 0.835$ , Self-Efficacy:  $\sqrt{0.550} = 0.742$ , Social Support:  $\sqrt{0.680} = 0.825$ , and Performance:  $\sqrt{0.520} = 0.721$

The square root of AVE for each construct (diagonal values) is greater than the correlation coefficients between that construct and all other constructs (off-diagonal values). This satisfies the Fornell and Larcker criterion, confirming that each construct is distinct and demonstrates discriminant validity. (Fornell C, Larcker DF(1981)).

# Structural Equation Model (SEM)

## Final adjusted SEM model ( 5 construct-21 items)



Several validity-fitting indices were also statistically accepted. For instance, the  $\chi^2$  value was statistically significant ( $\chi^2 = 1562.96$ ;  $df=271$ ;  $p=0.00$ ), and  $\chi^2 / df$  was 5.07, which was not greater than 5.0 (Ullman and Bentler 2012).

The GFI value, which was greater than 0.90, indicated a close fit between the observed data and the model ( GFI = 0.91) (144). The RMSEA value was less than 0.80, which indicated a reasonable approximation of the data (RMSEA = 0.07) Mw, B. (1993). "Alternative ways of assessing model fit." Testing structural equation models.

( $\chi^2 = 1562.96$ ;  $df=271$ ;  $p=0.00$ ),  $\chi^2 / df = 5.07$ , GFI = 0.91, IFI value 0.93, TLI=0.996 RMSEA = 0.07

# Contribution of the Model

**Table 9. Path Coefficients and Hypotheses Testing**

Hypothesis	Path	Standardized Coefficient ( $\beta$ )	Significance	Interpretation
Self-efficacy	→	Experience (MV)	.020 .006	3.109 .002
Self-effacing	→	AM-Motivation (IR)	.134 .020	6.689 ***
Self-efficacy	→	Community support	.136 .018	7.490 ***
Self-efficacy	→	Supervision-support	.096 .021	4.649 ***
Performance	→	Self-efficacy	1.110 .476	2.330 .020
Performance	→	Experience (MV)	.569 .093	6.107 ***
Performance	→	Community support	.955 .244	3.916 ***
Performance	→	Occupation /business	.685 .176	3.886 ***
Performance	→	AM-Motivation (IR)	7.052 .323	21.814 ***
Performance	→	Political leadership	2.691 .434	6.208 ***

Square Multiple Correlation

**Performance**

.403

**Self-Efficacy**

.188

SEM model( 6 constructs-23 items) explained approximately 40% of the variance in overall performance in FCHVs ( AM-IR, SE, CS, PCL, non-agriculture occupation)

self-efficacy to performance, the model that 18% of the variance in self-efficacy could be accounted for by the linear combination of the variables perceived autonomy motivation, community support, supportive supervision, and years of experience.

which is equal to the threshold of 40% recommended by Aulakh and Gencturk (2000).

A revised framework of the Causal factors model for performance enhancement in FCHVs

**Autonomy**

- Autonomous motivation (IR)

**Leadership**

- Political leadership

**Social support**

- Community support
- Supportive supervision

**4 items**

- Personal meaning
- Personal significance
- Training effort
- Humanitarian service

**3 items**

- Initiate community leader
- Build relations with stakeholders
- Advocate authority for resource

**6 items**

- Information support from the community(3item)
- Supportive and feedback support from supervisor(3items)

**Socio-economic factors**

- Work Experience
- Occupation(business/trading)

**Self Efficacy**

**6 items**

- Identify, refer,
- search case, prevent re-infection,
- reporting
- decision making
- Adapt situation

**Performance in active malaria case surveillance among FCHVs.**

**4 constructs-19 items model with 2 SES**

# Conclusion: Takeaway messages

- **Overall Finding:** This study provides the first national-level evidence on factors driving FCHVs' performance in active malaria case surveillance across Nepal's endemic regions, grounded in Self-Determination Theory (SDT).
- **Key Takeaway Messages:**
- **Self-efficacy is paramount.** FCHVs who believe in their own capability to perform malaria surveillance tasks are significantly more effective. Confidence-building training and mentorship programs are essential investments.
- **Autonomous motivation drives performance.** Identified regulation — where volunteers personally value and find meaning in their surveillance role — was among the strongest predictors of performance, underscoring that internalized motivation outperforms externally imposed compliance.
- **Leadership style matters — and can cut both ways.** Transformational/organizational transition leadership positively enhanced FCHV performance, while team-building leadership paradoxically showed a negative effect, suggesting that certain group-oriented approaches may dilute individual accountability or focus on surveillance tasks.
- **SDT is a valid and applicable framework in LMICs.** The successful application of Self-Determination Theory in this Nepali FCHV context validates its utility for designing health workforce interventions in low- and middle-income country settings.
- **Targeted interventions are urgently needed.** Given Nepal's failure to meet malaria case-reduction targets, programs must move beyond structural approaches and address the psychological and motivational determinants of FCHV behavior.
- **A critical evidence gap has been addressed.** This study establishes a baseline for evaluating FCHV performance in high-endemic regions, providing a foundation for future longitudinal and interventional research.

# Recommendations

✓ Recommendation for policy-level

## Create/reform Policy



1. **Training & capacity building**
  - Build leadership skills
  - Skills building program
2. **Incentive & Motivation**
3. **Supervision and support**

1. Develop a national FCHVs curriculum with refresher courses, e-Health tools, and a mentorship program.
2. Formalize stipends, health insurance, and public recognition (award, certificate).
3. Integrate FCHVs in the Health System, structured supervision by health professionals.

✓ Recommendation for Implementation level

## Encourage FCHVs



1. Engage local leaders to advocate FCHV's role in the forum.
2. FCHVs alliances & local fundraising

**Providing social support to FCHVs at the local health committee.**



## FCHVs.

- ✓ .Years of experience
- ✓ . Major occupation other than agriculture

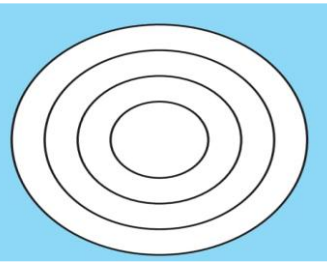


# Acknowledgments

## Gratitude to respected Professors



Mahidol University  
ASEAN Institute  
for Health Development



To all the supporting hands

# RA Training and data collection



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*Thank  
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