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Training, Incentives, and Malaria Cadre Performance: Examining the Mediating Role of Work Motivation

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ABSTRACT

Malaria remains a major public health challenge in Papua, where community-based control programs rely heavily on the effectiveness of malaria cadres. Although training and incentives are widely recognized as important human resource practices, previous findings regarding their influence on performance have been inconsistent, particularly in community health worker contexts. This study aims to examine the role of work motivation in explaining the relationship between training, incentives, and the performance of malaria cadres. A quantitative explanatory research design was employed using a census sampling approach involving malaria cadres participating in the PERDHAKI Malaria Program in Jayapura City. Data were collected through structured questionnaires and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). The findings indicate that training and incentives positively contribute to cadre performance and also enhance work motivation, which subsequently supports improved performance outcomes. However, the mediating role of work motivation appears to be relatively limited, suggesting that cadre performance is influenced more strongly by direct structural and operational interventions than by indirect motivational mechanisms alone. This study contributes to the human resource management literature by demonstrating that the role of motivation as a mediator is context-dependent in community-based health programs. Practically, the findings highlight the importance of integrating field-oriented training, fair incentive systems, supervision, and motivational support to strengthen malaria cadre performance sustainably.

Keywords: *Malaria Cadres, Training, Incentives, Work Motivation, Performance*

1. Introduction

Human resources constitute a critical foundation of organizational effectiveness in the public health sector, particularly in disease control programs that depend on frontline and community-based personnel. In malaria-endemic regions, the effectiveness of prevention, early detection, treatment support, surveillance, and reporting is strongly shaped by the performance of community health workers. Malaria cadres represent an essential extension of the formal health system because they connect health institutions with communities that often face geographical, economic, and informational barriers to accessing formal healthcare services. This role is particularly important in Papua, where malaria remains a persistent public health challenge and where community-based participation continues to be central to malaria elimination efforts. Recent reports also emphasize that Papua remains one of the most important malaria-endemic regions in Indonesia, making the role of local health workers and community cadres highly strategic in supporting case detection, treatment adherence, and community mobilization (Prameswari et al., 2025).

The performance of malaria cadres, however, should not be understood merely as an individual work outcome, but as the result of interaction between technical competence, organizational support, incentive systems, supervision, and psychological motivation. Previous studies on community health workers have shown that performance is influenced by multiple

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interrelated factors, including training quality, remuneration, workload, supervision, social recognition, and intrinsic commitment (Glenton et al., 2021; Kok et al., 2015; Ormel et al., 2019). More recent international studies further suggest that community health worker performance and retention are not determined by financial incentives alone, but by a broader motivational and organizational ecosystem that includes fair compensation, supportive supervision, professional identity, and opportunities for capacity development (Ghasemi et al., 2025; Okech et al., 2025). This indicates that cadre performance requires an integrated human resource management perspective rather than a narrow focus on isolated organizational interventions. Recent malaria-focused studies also highlight that community health workers play a central role in sustaining malaria programs, especially when their roles are supported through appropriate training, supervision, and integration into local health systems (Buback et al., 2025; Ndalama et al., 2025).

From the perspective of human resource management, training and incentives are among the most frequently examined organizational practices affecting employee performance. Training is expected to improve knowledge, technical skills, confidence, and work readiness, while incentives are designed to strengthen effort, discipline, and target-oriented behavior (Noe, 2020; Salas et al., 2015; Chen et al., 2022). Nevertheless, empirical findings remain inconsistent. Some studies report that training significantly improves motivation and performance because it strengthens competence and task mastery (Lestari & Afifah, 2020; Uslu et al., 2021), whereas other studies suggest that training does not automatically produce performance improvement when the transfer of training into field practice is weak (Blume et al., 2019). Similarly, incentives may improve performance when they are perceived as fair, meaningful, and linked to measurable work outcomes, but may be less effective when they are viewed as inadequate, inconsistent, or disconnected from actual workload (Chen et al., 2022; Ormel et al., 2019; Zaresani & Scott, 2021). Thus, the effects of training and incentives on performance are not always direct, linear, or universal.

These inconsistent findings reveal an important theoretical issue: organizational interventions may influence performance through psychological mechanisms rather than solely through direct structural effects. In this regard, work motivation becomes a key explanatory construct. Self-Determination Theory argues that motivation is strengthened when individuals experience competence, autonomy, and relatedness in their work environment (Ryan & Deci, 2020). Training may enhance motivation by increasing cadres' perceived competence and confidence, while incentives may strengthen motivation by providing recognition, fairness, and external reinforcement. However, motivation may not fully explain performance in all contexts. In operationally demanding health programs such as malaria control, performance also depends heavily on technical accuracy, availability of resources, reporting systems, supervision, and field-level constraints. Therefore, work motivation should be examined not only as an independent predictor of performance, but also as a mediating mechanism whose strength may vary depending on the work context.

The context of PERDHAKI malaria cadres in Jayapura City provides a particularly relevant setting for examining this issue. Unlike formal health workers, malaria cadres generally operate in a community-based service structure characterized by limited formal employment status, modest financial incentives, high dependence on voluntary commitment, and direct engagement with communities. These conditions create a distinctive human resource environment in which performance is shaped by both organizational practices and psychological commitment. In such a context, training may directly improve performance by strengthening technical competence, while incentives may reinforce work discipline and target achievement. At the same time, both training and incentives may also improve performance indirectly by increasing work motivation. This dual pathway is theoretically important because it helps explain why previous studies have produced mixed findings regarding the effects of training and incentives on performance.

Despite the growing literature on community health worker performance, several research gaps remain. First, most previous studies have focused on formal employees, general health workers, or community health workers in broader health programs, while empirical studies specifically examining malaria cadres in endemic regions remain limited. Second, previous studies often examine training, incentives, motivation, and performance as separate relationships, resulting in fragmented explanations of how organizational interventions influence cadre performance. Third, although recent international studies emphasize the importance of motivation, remuneration, and supervision in shaping community health worker performance, only limited research has tested work motivation as a mediating variable within a structural model, particularly in malaria cadre settings. These gaps indicate the need for a more integrated analytical model that combines organizational and psychological perspectives.

This study offers novelty by examining work motivation as a mediating mechanism in the relationship between training, incentives, and the performance of malaria cadres in Jayapura City, Papua Province. Unlike previous studies that focus mainly on direct effects or formal employment contexts, this study positions work motivation as a behavioral bridge that explains how human resource practices are translated into performance outcomes within a community-based malaria program. This approach contributes to human resource management literature by demonstrating that the role of motivation as a mediator is context-dependent, especially in public health programs where performance is shaped by both technical competence and motivational commitment.

Accordingly, this study aims to analyze the effects of training and incentives on the performance of malaria cadres, with work motivation as a mediating variable, in the PERDHAKI malaria program in Jayapura City, Papua Province. The findings are expected to provide theoretical contributions to the literature on human resource management and community health worker performance, as well as practical implications for improving malaria elimination strategies through more effective training, fair incentive systems, and motivation-based performance support.

2. Literature Review

Training

Training is one of the most important human resource management practices because it is designed to improve employees' knowledge, technical skills, behavioral readiness, and ability to perform work tasks effectively. In public health programs, training is particularly important because frontline workers are required to perform tasks that demand procedural accuracy, communication ability, and consistency in service delivery. For malaria cadres, training is not merely a formal learning activity, but a strategic mechanism for strengthening their ability to conduct screening, support treatment adherence, educate communities, and report malaria-related cases accurately.

From the perspective of training transfer theory, the effect of training on performance depends not only on what participants learn during training sessions, but also on whether they are able and motivated to apply that knowledge in real work settings (Blume et al., 2019). This is important because training may improve competence, but competence does not automatically become performance unless it is supported by motivation, supervision, relevant materials, and opportunities for practice. Thus, the effectiveness of training should be understood as a process that connects learning, motivation, transfer, and performance.

Previous studies show mixed findings regarding the relationship between training and performance. Some studies indicate that training significantly improves employee performance because it enhances competence, confidence, and work readiness (Lestari & Afifah, 2020; Uslu et al., 2021). However, other studies show that training does not always produce significant performance improvement when training materials are not aligned with work demands or when

post-training support is weak. These contradictory findings suggest that training is not universally effective. Its impact depends on whether the training is contextually relevant and whether participants have sufficient motivation and organizational support to apply what they have learned.

In the context of malaria cadres in Jayapura City, this issue is particularly relevant. Cadres work in community-based and resource-constrained environments, where they are expected to translate training outcomes into practical field activities. Unlike formal health workers who operate within clearer institutional structures, malaria cadres often depend on limited resources, informal supervision, and personal commitment. Therefore, training is expected to influence performance both directly, by improving technical competence, and indirectly, by strengthening work motivation. When cadres perceive training as relevant to field realities, they are more likely to feel capable, confident, and motivated to perform their duties.

Thus, training in this study is positioned not only as a technical intervention, but also as a motivational stimulus. It may strengthen cadres' sense of competence, which is a core component of intrinsic motivation in Self-Determination Theory (Ryan & Deci, 2020). This theoretical logic explains why training is expected to influence work motivation and performance in the malaria cadre context.

Incentives

Incentives are organizational mechanisms used to encourage employee effort, reinforce desirable behavior, and improve work outcomes. In human resource management, incentive systems are often explained through pay-for-performance and expectancy perspectives, which assume that individuals are more likely to exert effort when they believe that performance will lead to valued rewards (Chen et al., 2022). However, incentives are not purely economic instruments. Their effectiveness also depends on perceived fairness, recognition, consistency, and the extent to which rewards reflect actual workload and contribution.

Empirical findings on incentives and performance remain inconsistent. Several studies show that incentives have a positive effect on motivation and performance because they increase work enthusiasm, discipline, and target orientation (Arfandi & Candra, 2024; Pratama, 2021). In contrast, other studies suggest that incentives may fail to improve performance when they are perceived as inadequate, delayed, unfair, or disconnected from real work demands (Ormel et al., 2019). These mixed findings indicate that incentives do not operate automatically. Their effects depend on how cadres interpret the meaning, fairness, and usefulness of the incentives they receive.

In community-based health programs, incentives have a more complex meaning than in formal employment settings. For malaria cadres, incentives may function not only as financial compensation, but also as symbolic recognition of social contribution. This dual role is important because many cadres work without formal employment status and may rely heavily on personal commitment, social responsibility, and community recognition. Therefore, incentives can strengthen motivation when they are perceived as fair and meaningful, but they may also create dissatisfaction when they are viewed as insufficient or inconsistently distributed.

Theoretically, incentives can influence performance through two pathways. First, they may have a direct effect by encouraging cadres to complete tasks, meet targets, and maintain discipline. Second, they may have an indirect effect through work motivation by increasing cadres' sense of appreciation and perceived fairness. This dual mechanism is especially relevant in malaria control programs because cadre performance requires both external reinforcement and internal commitment. In this sense, incentives should be understood not merely as financial rewards, but as part of a broader motivational system that shapes work behavior.

Work Motivation

Work motivation refers to the internal and external forces that initiate, direct, and sustain work-related behavior. It explains why individuals are willing to exert effort, maintain

persistence, and achieve work objectives. In organizational studies, motivation is often viewed as a key psychological mechanism linking human resource practices to performance outcomes. Self-Determination Theory distinguishes between intrinsic motivation, which emerges from internal satisfaction and perceived competence, and extrinsic motivation, which is influenced by rewards, recognition, and external reinforcement (Ryan & Deci, 2020).

In the context of malaria cadres, work motivation has particular theoretical and practical importance. Cadres often work in challenging environments, including limited facilities, community-level barriers, high mobility demands, and modest financial incentives. Under such conditions, performance cannot be explained solely by formal competence or external rewards. Cadres also need internal commitment, confidence, social responsibility, and willingness to serve the community. Therefore, work motivation becomes a crucial mechanism that connects organizational support with actual work behavior.

Previous studies generally show that motivation has a positive effect on performance (Wang et al., 2024). However, the strength of this effect may vary across contexts. In formal organizations, motivation may strongly influence performance because employees work within structured systems, clear job descriptions, and stable reward mechanisms. In contrast, in community-based health programs, motivation may be necessary but not sufficient. Even highly motivated cadres may face performance constraints if they lack adequate training, supervision, logistics, or operational support.

This distinction is important for the present study. Work motivation is not treated merely as an independent predictor of performance, but as a mediating mechanism that explains how training and incentives are translated into cadre performance. Training may strengthen motivation by increasing cadres' perceived competence, while incentives may strengthen motivation by providing recognition and external reinforcement. Nevertheless, because malaria cadre performance also depends on technical and structural factors, the mediating role of motivation may be significant but not necessarily dominant. This argument provides a stronger theoretical basis for examining motivation as a mediator in this study.

Performance

Performance refers to the extent to which individuals achieve work objectives in terms of quantity, quality, timeliness, and adherence to established standards (Armstrong & Taylor, 2020). In public health programs, performance is not limited to output achievement, but also includes procedural accuracy, service consistency, reporting discipline, and contribution to program effectiveness. For malaria cadres, performance may be reflected in their ability to support screening activities, assist treatment processes, conduct community education, and submit timely and accurate reports.

The performance of malaria cadres is shaped by a combination of structural, technical, and psychological factors. Training strengthens technical competence and task readiness, incentives reinforce effort and discipline, while motivation sustains commitment and persistence. However, these factors should not be viewed separately. Previous studies often examine training, incentives, motivation, and performance as isolated relationships, resulting in fragmented explanations of performance outcomes. In reality, cadre performance is more likely to emerge from the interaction between organizational interventions and individual psychological responses.

This integrated perspective is particularly important in malaria-endemic areas. Cadres work in community settings where service outcomes depend not only on individual willingness, but also on technical skills, community trust, program support, and logistical readiness. Therefore, performance in this study is conceptualized as an outcome of both direct organizational support and indirect motivational processes. This approach allows the study to explain not only whether training and incentives affect performance, but also how and through what mechanism these effects occur.

Hypothesis Development

Training and Work Motivation

Training may strengthen work motivation by improving cadres' perceived competence and confidence in carrying out malaria-related tasks. According to Self-Determination Theory, competence is one of the basic psychological needs that supports intrinsic motivation (Ryan & Deci, 2020). When cadres understand malaria procedures, feel capable of conducting screening, and are confident in communicating with communities, they are more likely to develop stronger motivation to perform their roles.

However, the motivational effect of training depends on training quality and relevance. Training that is theoretical, irregular, or disconnected from field conditions may have limited motivational value. Conversely, practical and context-specific training can increase cadres' sense of preparedness and psychological readiness. In the Jayapura context, where cadres perform field-based tasks under community-level constraints, relevant training is expected to strengthen work motivation.

H1: *Training has a positive effect on work motivation.*

Incentives and Work Motivation

Incentives may increase work motivation by providing external reinforcement, recognition, and a sense of fairness. From the expectancy perspective, individuals are more motivated when they believe that their effort and performance will be followed by valued rewards (Chen et al., 2022). In malaria cadre programs, incentives can also serve as symbolic recognition because cadres often work without formal employment status.

Nevertheless, the relationship between incentives and motivation is not automatic. Incentives may fail to motivate when they are perceived as unfair, too small, delayed, or unrelated to actual workload (Ormel et al., 2019). Therefore, the motivational effect of incentives depends on cadres' perceptions of fairness, adequacy, and consistency. In the context of Jayapura, incentives are expected to strengthen motivation when cadres perceive them as meaningful support for their contribution to malaria control.

H2: *Incentives have a positive effect on work motivation.*

Work Motivation and Performance

Work motivation influences performance by increasing effort, persistence, discipline, and willingness to achieve work targets. Motivated cadres are more likely to be proactive in conducting community outreach, completing assigned tasks, maintaining reporting consistency, and supporting malaria elimination activities. This is consistent with motivation theory, which views motivation as a psychological driver of goal-directed behavior.

However, in malaria cadre settings, motivation alone may not fully determine performance. Cadres also require technical competence, field resources, supervision, and clear operational procedures. Therefore, work motivation is expected to have a positive effect on performance, but its effect may depend on the broader organizational context. This view strengthens the argument that motivation is important, but should be examined together with training and incentives.

H3: *Work motivation has a positive effect on performance.*

Training and Performance

Training is expected to improve performance because it enhances the knowledge and skills required to perform malaria-related duties. Through training, cadres gain better understanding of screening procedures, treatment support, community education, and reporting requirements. This competence enables cadres to perform tasks more accurately, efficiently, and consistently.

Nevertheless, previous findings show that training does not always lead to performance improvement when transfer of training is weak (Blume et al., 2019). Therefore, the effect of

training on performance depends on whether training content is relevant to field needs and whether cadres have opportunities to apply what they have learned. In Jayapura, where malaria cadres perform operational tasks directly in the community, practical and field-oriented training is expected to have a direct positive effect on performance.
H4: *Training has a positive effect on performance.*

Incentives and Performance

Incentives are expected to improve performance by encouraging effort, discipline, and target achievement. When incentives are perceived as fair and linked to work outcomes, cadres may become more committed to completing assigned tasks and meeting program targets. In malaria programs, incentives can help reinforce performance behaviors such as active screening, timely reporting, and consistent participation in community activities.

However, incentives may not always produce strong performance effects if they are not supported by clear performance indicators or if they are perceived as inadequate. Therefore, incentives should be understood as reinforcing mechanisms rather than the sole determinant of performance. In the context of malaria cadres, incentives are expected to have a positive effect on performance, particularly when they are aligned with workload and program targets.
H5: *Incentives have a positive effect on performance.*

Mediating Role of Work Motivation

The mediating role of work motivation is theoretically important because it explains why training and incentives may influence performance differently across contexts. Training may improve performance directly by enhancing competence, but it may also improve performance indirectly by increasing cadres' confidence and motivation. Similarly, incentives may directly encourage target achievement, but they may also indirectly improve performance by strengthening perceived recognition and work enthusiasm.

This mediation logic integrates human resource management theory with the realities of malaria cadre work. In formal organizations, HR practices often operate through established systems of supervision, career development, and compensation. In contrast, malaria cadres work in a more informal and community-based structure where motivation, recognition, and social commitment are highly important. Therefore, work motivation may function as a psychological bridge between organizational interventions and performance outcomes.

At the same time, the mediation effect may not be dominant because malaria cadre performance also depends on structural and technical factors. This means that training and incentives may influence performance both directly and indirectly. Examining work motivation as a mediator therefore allows this study to provide a more nuanced explanation of the relationship between human resource practices and cadre performance.
H6: *Work motivation mediates the effect of training on performance.*
H7: *Work motivation mediates the effect of incentives on performance.*

3. Methods

This study employed a quantitative explanatory research design to examine the causal relationships among training, incentives, work motivation, and the performance of malaria cadres. This design was selected because the study aimed to test both direct and indirect relationships within a structural model, particularly the mediating role of work motivation. Compared with purely descriptive approaches, explanatory research allows for a more rigorous assessment of the causal mechanisms underlying the observed relationships among variables (Creswell & Creswell, 2018).

Although limited interviews were conducted, this study was not designed as a full mixed-method study. The qualitative information was used only as supporting contextual data to clarify

and enrich the interpretation of the quantitative findings. Therefore, the main analytical approach remained quantitative, while the qualitative data served as supplementary evidence in the discussion of training implementation, incentive systems, motivational conditions, and performance-related barriers.

Research Location and Timeframe

The study was conducted among malaria cadres involved in the PERDHAKI malaria program in Jayapura City, Papua Province. This location was selected because Jayapura is a malaria-endemic area where community-based cadres play a critical role in early detection, treatment support, community education, and reporting. The context is also relevant because malaria cadres work in a community-based service system characterized by limited formal employment status, modest incentives, and high dependence on motivation and organizational support.

Data collection was carried out over a four-month period from September to December 2025. This period included instrument preparation, pilot testing, questionnaire distribution, limited directed interviews, documentation review, and data analysis.

Population, Sample, and Sampling Technique

The population in this study consisted of all malaria cadres in Jayapura City who were actively involved in implementing the PERDHAKI malaria program. The total population was 103 malaria cadres.

This study used census sampling, also known as saturated sampling, in which all members of the population are included as research respondents (Sugiyono, 2019). This technique was chosen because the population size was relatively limited and accessible. By involving all 103 cadres, the study was expected to represent the population of PERDHAKI malaria cadres in Jayapura City more comprehensively. Therefore, the final sample consisted of 103 respondents.

Types and Sources of Data

This study used primary and secondary data. The primary data consisted mainly of quantitative data obtained through structured questionnaires. These data captured respondents' perceptions of training, incentives, work motivation, and malaria cadre performance. All questionnaire items were measured using a five-point Likert scale.

Supporting qualitative data were obtained through limited directed interviews. These interviews were conducted to provide contextual explanations related to the implementation of training, the perceived fairness and adequacy of incentives, motivational conditions, and practical barriers affecting cadre performance. The qualitative data were not used to develop a separate qualitative model, but to support the interpretation of the quantitative results.

Secondary data were obtained from relevant documents, including PERDHAKI program information, local health-related documents, and scientific literature relevant to malaria cadres, human resource management, training, incentives, work motivation, and performance.

Data Collection Techniques

Data were collected using three techniques: questionnaires, limited directed interviews, and documentation.

First, the questionnaire served as the main instrument for collecting quantitative data. It contained closed-ended statements developed based on the indicators of each research variable. The questionnaire was distributed to all 103 malaria cadres included in the census sample.

Second, limited directed interviews were conducted to obtain supporting qualitative information. The interviews focused on cadres' experiences regarding training relevance, incentive implementation, motivational factors, and obstacles encountered in carrying out malaria program duties. These interviews were semi-structured in nature, allowing the

researcher to maintain focus on the research variables while still capturing contextual explanations from the respondents.

Third, documentation and literature review were used to obtain secondary information and strengthen the theoretical and contextual foundation of the study. Documentation was also used to support the interpretation of the research setting and the role of malaria cadres in the PERDHAKI program.

Qualitative Data Analysis and Integration

To address the supporting qualitative component, the interview data were analyzed using a thematic summary approach. This procedure was selected because the qualitative data were intended to support and clarify the quantitative findings rather than to generate a separate qualitative theory or independent qualitative result.

The analysis was conducted in several stages. First, interview notes were reviewed repeatedly to identify recurring issues related to training implementation, incentive distribution, work motivation, and performance barriers. Second, similar responses were grouped into several thematic categories, such as training relevance, field application of training, incentive fairness, incentive adequacy, motivational reinforcement, supervision, and operational constraints. Third, these themes were compared with the quantitative findings to determine whether they supported, clarified, or provided contextual explanation for the statistical results.

The integration of qualitative data was conducted at the interpretation stage. For example, interview information regarding the practical usefulness of training was used to explain why training had a strong effect on performance. Similarly, qualitative insights regarding incentive fairness and recognition were used to interpret the relationship between incentives, work motivation, and performance. Thus, the qualitative data functioned as explanatory support for the discussion of SEM-PLS results, while the primary evidence and hypothesis testing remained based on quantitative analysis.

This approach maintains methodological consistency because the study is positioned as a quantitative explanatory study supported by limited qualitative contextual evidence, rather than as a full mixed-method design.

Variable Measurement

Research variables were measured using a summated rating scale, which involves summing or averaging respondents' scores across indicators (Hair et al., 2021). All variables were measured using a five-point Likert scale with the following response categories: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree. The Likert scale was used to systematically measure respondents' perceptions, attitudes, and assessments of the research variables (Likert, 1932).

Operational Definitions of Variables

Operational definitions were developed to clarify the meaning and measurement boundaries of each variable and to avoid differences in interpretation (Sekaran & Bougie, 2016). The variables in this study consisted of training (X1), incentives (X2), work motivation (Z), and cadre performance (Y). The operational definitions and indicators of each variable are presented in Table 1.

Table 1. Operational Definitions of Variables

Variable	Operational Definition	Indicators	Scale
Training (X1)	A planned learning process aimed at improving malaria cadres' knowledge, skills, and work readiness in carrying out malaria program duties.	Instructor/trainer quality; relevance of training materials; appropriateness of training methods; usefulness of training for work completion; improvement of	Likert 1–5

		knowledge and skills; participatory training methods.	
Incentives (X2)	Additional rewards or compensation received by cadres for task implementation and work achievement within the malaria program.	Incentive adequacy; ability of incentives to increase work enthusiasm; incentive fairness; conformity with regulations; eligibility based on targets; adequacy of income received.	Likert 1–5
Work Motivation (Z)	Cadres' internal and external drive to work, persist, collaborate, and achieve work targets in the malaria program.	Need for achievement; recognition; affiliation; pride in appreciation; responsibility toward work duties; confidence in performing tasks.	Likert 1–5
Cadre Performance (Y)	The level of work achievement of malaria cadres in carrying out screening, service delivery, community support, and reporting tasks in accordance with program targets.	Work quality; quantity of work; achievement of assigned targets; ability to exceed targets; timeliness; efficiency and effectiveness.	Likert 1–5

Instrument Development and Measurement

Data were collected using a structured questionnaire developed based on established theoretical constructs and prior empirical studies. Measurement items for each variable were adapted from validated scales in the literature and adjusted to the context of malaria cadres.

Training was measured using indicators related to instructor quality, relevance of training materials, appropriateness of training methods, usefulness for task completion, improvement of knowledge and skills, and participatory learning methods (Uslu et al., 2021). Incentives were measured through perceptions of adequacy, fairness, regulatory conformity, target-based eligibility, and their ability to increase work enthusiasm (Chen et al., 2022; Ormel et al., 2019). Work motivation was measured using indicators related to achievement, recognition, affiliation, appreciation, responsibility, and confidence, which are consistent with motivation theory and the behavioral characteristics of community-based workers (Robbins & Judge, 2020; Ryan & Deci, 2020). Cadre performance was measured using indicators of quality, quantity, target achievement, timeliness, efficiency, and effectiveness of work outcomes (Armstrong & Taylor, 2020).

Prior to the main data collection, the questionnaire was pilot tested on a small group of respondents to assess clarity, relevance, and content suitability. Feedback from the pilot test was used to refine the wording of several items to ensure that they were understandable and appropriate for the malaria cadre context. The measurement model was subsequently evaluated using convergent validity, discriminant validity, composite reliability, and Cronbach's alpha within the SEM-PLS framework (Hair et al., 2021).

Ethical Considerations

This study adhered to ethical standards for research involving human participants. Prior to data collection, respondents were informed about the purpose of the study, the voluntary nature of participation, the confidentiality of their responses, and their right to withdraw from participation. Informed consent was obtained before respondents completed the questionnaire or participated in interviews. Respondents were assured that the data would be used solely for academic research purposes and reported only in aggregate form to protect anonymity.

Bias Control

Several procedural and statistical steps were taken to minimize potential bias. Procedurally, anonymity and confidentiality were ensured to reduce social desirability bias. Respondents were informed that there were no right or wrong answers and that their responses would not affect their position as malaria cadres. Questionnaire items were written clearly and adjusted to the research context to reduce ambiguity and misunderstanding.

Statistically, common method bias was assessed using collinearity diagnostics within the SEM-PLS model, including variance inflation factor values. This step was conducted to ensure that multicollinearity and common method variance did not substantially distort the estimated relationships among constructs (Hair et al., 2021; Kock, 2015). In addition, the use of limited qualitative interviews and documentation provided contextual triangulation to support the interpretation of the quantitative findings.

Data Analysis Techniques

Data analysis consisted of descriptive analysis, qualitative thematic summary, and inferential analysis using SEM-PLS.

Descriptive analysis was used to describe respondent characteristics and response trends for each research variable. The analysis included frequency, percentage, mean, and standard deviation values. These descriptive statistics were used to provide an overview of the respondents and the general tendency of their perceptions regarding training, incentives, work motivation, and performance.

The qualitative data obtained from limited directed interviews were analyzed through thematic summary, as explained earlier. The results of this analysis were not presented as independent qualitative findings, but were integrated into the discussion to contextualize and support the interpretation of the quantitative results.

Inferential analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4.0. SEM-PLS was selected for several methodological reasons. First, this study examined complex relationships involving two independent variables, one mediating variable, and one dependent variable within a single structural model. Second, SEM-PLS is suitable for studies with relatively small sample sizes and does not require strict normality assumptions (Hair et al., 2021; Latan & Ghozali, 2021). Third, the study population was relatively homogeneous because all respondents were malaria cadres within the same program, making variance-based SEM appropriate for estimating the relationships among constructs.

The SEM-PLS analysis involved two main stages: evaluation of the measurement model and evaluation of the structural model. The measurement model was assessed through outer loading, Average Variance Extracted (AVE), composite reliability, Cronbach's alpha, and discriminant validity. The structural model was assessed through path coefficients, t-statistics, p-values, R-square, effect size, collinearity diagnostics, and predictive assessment.

Hypothesis Testing and Mediation Analysis

Hypothesis testing was performed using the bootstrapping procedure in SmartPLS 4.0. The significance of direct and indirect effects was evaluated based on path coefficient values, t-statistics, p-values, and confidence intervals. A hypothesis was considered supported when the t-statistic exceeded 1.96 and the p-value was less than 0.05 at the 5% significance level (Hair et al., 2021).

Mediation analysis was conducted by examining the indirect effects of training and incentives on cadre performance through work motivation. The mediation effect was considered significant when the bootstrapped indirect effect was statistically significant and the confidence interval did not include zero (Preacher & Hayes, 2008). This procedure was used to determine whether work motivation functioned as a mediating mechanism linking human resource practices to malaria cadre performance.

4. Result and Discussion

Results

Description of Respondent Characteristics

Table 2 presents the demographic profile of malaria cadres involved in this study, including education level, gender, and age distribution.

Table 2. Characteristics of Malaria Cadres in the PERDHAKI Malaria Program, Jayapura City

Characteristics	Category	Number (Persons)	Percentage (%)
Education	Senior High School	92	89.32
	Diploma	4	3.88
	Bachelor's Degree	7	6.79
	Total	103	100.00
Gender	Male	5	4.85
	Female	98	95.15
	Total	103	100.00
Age (Years)	20–29	10	9.71
	30–39	43	41.75
	40–49	40	38.83
	≥ 50	10	9.71
	Total	103	100.00

Source: Processed data, 2025.

The results indicate that the majority of respondents have a senior high school education, representing 89.32% of the total sample, followed by diploma graduates at 3.88% and bachelor's degree holders at 6.79%. This distribution suggests that most malaria cadres possess a moderate level of formal education. From a program management perspective, this condition has important implications for training design. Training programs should therefore emphasize practical, simple, participatory, and field-oriented learning methods to ensure that training materials can be effectively understood and applied in real work situations.

In terms of gender, the respondents are predominantly female, accounting for 95.15% of the total sample. This profile is consistent with the general characteristics of community-based health workers, who are often women because of their close involvement in family health, community networks, and local caregiving roles. This finding implies that malaria control programs should consider gender-sensitive approaches in training delivery, communication strategies, scheduling flexibility, and community engagement mechanisms.

Regarding age distribution, most respondents are within the productive age group of 30 to 49 years, accounting for 80.58% of the sample. This indicates that the majority of cadres are at an age where they are likely to possess sufficient physical capacity, social maturity, and community experience to perform their roles effectively. The dominance of this productive age group also suggests that performance outcomes are less likely to be constrained by age-related limitations and are more likely to be influenced by organizational factors, training quality, incentive systems, and work motivation.

Thus, respondent characteristics are not merely demographic information, but provide contextual insight for interpreting the relationships among training, incentives, work motivation, and cadre performance in the PERDHAKI malaria program.

Descriptive Statistics of Variables

Descriptive statistics were used to provide an overview of respondents' perceptions of the variables examined in this study, namely training, incentives, work motivation, and malaria cadre performance. The analysis was conducted by examining the mean and standard deviation of each indicator and variable. The mean value indicates the general tendency of respondents' perceptions, while the standard deviation indicates the degree of response variability.

Interpretation of the mean scores refers to the five-point Likert scale, where higher values indicate more positive perceptions.

Table 3. Descriptive Statistics of Research Variables and Indicators

Variable	Indicator	Statement	Mean	Standard Deviation
Job Training (X1)	P1	The instructor masters the training material and is able to explain it well	4.18	0.61
	P2	The training material is easy to understand	4.16	0.58
	P3	The training material matches job needs	4.09	0.64
	P4	The training helps complete work more easily and quickly	3.98	0.69
	P5	Knowledge and skills increase after the training	4.11	0.62
	P6	Participatory training methods make the sessions more engaging	4.17	0.57
		Mean score of Job Training	4.11	0.62
Incentives (X2)	I1	The incentive amount meets expectations	4.09	0.66
	I2	Incentives increase work enthusiasm	4.17	0.59
	I3	Incentives are perceived as fair relative to work effort	4.05	0.68
	I4	Incentives are provided in accordance with regulations	4.05	0.65
	I5	I am eligible to receive incentives according to my personal targets	4.01	0.71
	I6	The income received is sufficiently adequate	4.09	0.63
		Mean score of Incentives	4.08	0.65
Work Motivation (Z)	M1	I strive to do my best at work	4.12	0.60
	M2	Recognition motivates me to work better	3.98	0.72
	M3	I prefer working with colleagues rather than working alone	4.16	0.58
	M4	I feel proud when my work receives appreciation	4.15	0.59
	M5	I prioritize work duties over personal interests	4.03	0.67
	M6	I am confident in my ability to work well	3.91	0.74
		Mean score of Work Motivation	4.06	0.65
Performance (Y)	K1	I complete work according to established standards	4.15	0.60
	K2	I produce good quality work outcomes	4.06	0.64
	K3	I complete the required amount of work as targeted	4.08	0.63
	K4	I complete work beyond the assigned targets	3.97	0.70

	K5	I complete work within the specified timeframe	4.08	0.62
	K6	I prioritize efficiency and effectiveness in my work	3.96	0.71
		Mean score of Performance	**4.05**	**0.65**

Source: Processed data, 2025.

Overall, the mean scores of all variables fall within the high category, with training showing the highest mean score of 4.11, followed by incentives at 4.08, work motivation at 4.06, and performance at 4.05. These results indicate that respondents generally perceive training, incentives, motivation, and performance positively.

For training, the highest score is found in participatory training methods, indicating that interactive learning approaches are well received by cadres. However, the relatively lower score on the indicator related to completing work more easily and quickly suggests that training outcomes may not yet be fully translated into operational efficiency. This finding supports the argument that training transfer remains an important issue in malaria cadre performance.

For incentives, respondents generally show positive perceptions. Nevertheless, the relatively lower score on eligibility based on personal targets suggests that some cadres may still perceive ambiguity in the link between performance targets and incentive allocation. This implies that incentive systems should be made more transparent, measurable, and clearly connected to actual work contributions.

Work motivation also shows a high mean score, particularly on collaboration and appreciation-related indicators. However, the lowest score is found in confidence in performing work well. This suggests that some cadres may still require additional coaching, supervision, feedback, or technical reinforcement to strengthen their confidence in carrying out malaria-related duties.

Performance scores indicate that cadres generally perceive themselves as capable of meeting work standards. However, the lower scores on exceeding assigned targets and prioritizing efficiency and effectiveness suggest that performance improvement should not focus only on task completion, but also on improving work processes, productivity, and service quality.

The standard deviation values presented in Table 3 show relatively low to moderate response variability, ranging from 0.57 to 0.74. This indicates that respondents' perceptions are generally homogeneous. However, several indicators, such as confidence in work ability, recognition as a motivational factor, eligibility for incentives, and work efficiency, show slightly higher variability. This suggests that cadres may have different experiences regarding motivational reinforcement, incentive clarity, and the practical application of training in field conditions.

Research Instrument Testing

Research instrument testing was conducted to ensure that the indicators used in this study are valid and reliable as measurement tools for training, incentives, work motivation, and cadre performance. The instrument testing consisted of validity and reliability assessments. Validity testing aimed to determine the extent to which the indicators measured the intended constructs, while reliability testing aimed to assess the internal consistency of respondents' answers.

Measurement Model Evaluation

The measurement model evaluation was conducted to assess the validity and reliability of the indicators in the Partial Least Squares Structural Equation Modeling framework. The initial step involved specifying the structural model according to the research hypotheses, followed by

running the PLS algorithm using SmartPLS 4.0 to obtain outer loading, Average Variance Extracted, Composite Reliability, Cronbach's Alpha, and discriminant validity values.

Validity testing in this study consisted of convergent validity and discriminant validity. Reliability testing was assessed using Composite Reliability and Cronbach's Alpha. An indicator is considered valid when its outer loading value is greater than 0.70 and the AVE value is greater than 0.50. A construct is considered reliable when its Composite Reliability and Cronbach's Alpha values exceed 0.70.

Convergent Validity

Convergent validity was assessed to determine whether the indicators of each construct were strongly correlated and adequately represented the latent variable being measured. Convergent validity was evaluated based on outer loading and Average Variance Extracted values. The results are presented in Table 4.

Table 4. Convergent Validity Test Results

Variable	Indicator	Outer Loading	AVE	Remarks
Training	P1	0.885	0.850	Valid
	P2	0.878		Valid
	P3	0.970		Valid
	P4	0.869		Valid
	P5	0.950		Valid
	P6	0.974		Valid
Incentives	I1	0.720	0.668	Valid
	I2	0.903		Valid
	I3	0.844		Valid
	I4	0.871		Valid
	I5	0.729		Valid
	I6	0.818		Valid
Work Motivation	M1	0.783	0.599	Valid
	M2	0.777		Valid
	M3	0.737		Valid
	M4	0.749		Valid
	M5	0.824		Valid
	M6	0.771		Valid
Performance	K1	0.917	0.747	Valid
	K2	0.927		Valid
	K3	0.838		Valid
	K4	0.847		Valid
	K5	0.903		Valid
	K6	0.739		Valid

Source: SmartPLS 4.0 output, processed 2025.

The results show that all outer loading values exceed the recommended threshold of 0.70 and all AVE values exceed 0.50. Therefore, the indicators meet the criteria for convergent validity and are considered adequate for measuring their respective constructs.

However, several indicators, particularly P3, P5, and P6 in the training construct, have very high outer loading values close to or above 0.95. Although high loadings indicate strong indicator reliability, values that are extremely high may also indicate potential item redundancy or similarity in wording among indicators. Therefore, these results should be interpreted carefully. To address this concern, further assessment of discriminant validity and common method bias was conducted. Since the HTMT values and collinearity diagnostics remained within acceptable thresholds, the indicators were retained in the model.

Discriminant Validity

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio. HTMT was used to determine whether each construct was empirically distinct from the other constructs in the model. A construct is considered to have adequate discriminant validity when the HTMT value is below the recommended threshold of 0.90.

Table 5. Discriminant Validity Test Using HTMT

Construct Relationship	HTMT Value	Remarks
Training → Incentives	0.782	Valid
Training → Work Motivation	0.846	Valid
Training → Performance	0.873	Valid
Incentives → Work Motivation	0.821	Valid
Incentives → Performance	0.795	Valid
Work Motivation → Performance	0.768	Valid

Source: SmartPLS 4.0 output, processed 2025.

The HTMT results show that all construct relationships have values below the threshold of 0.90. This indicates that each construct in the model is empirically distinct and that the measurement model satisfies the discriminant validity requirement. These results also strengthen the validity of the model, particularly because several indicators in the training construct show very high outer loading values.

Composite Reliability and Cronbach's Alpha

Reliability testing was conducted to assess the internal consistency of the indicators in measuring the latent constructs. Reliability was evaluated using Composite Reliability and Cronbach's Alpha. A construct is considered reliable when both values exceed 0.70. The results are presented in Table 6.

Table 6. Composite Reliability and Cronbach's Alpha Test Results

Variable	Composite Reliability	Cronbach's Alpha	Remarks
Training	0.966	0.964	Reliable
Incentives	0.902	0.898	Reliable
Work Motivation	0.878	0.866	Reliable
Cadre Performance	0.939	0.931	Reliable

Source: SmartPLS 4.0 output, processed 2025.

The results show that all research variables have Composite Reliability and Cronbach's Alpha values above 0.70. Therefore, all constructs meet the reliability criteria. However, the reliability value of the training construct is very high, which is consistent with the high outer loading values found in several training indicators. This may indicate strong internal consistency, but it also suggests the need to consider possible item redundancy in future instrument refinement.

Structural Model Evaluation

The structural model evaluation was conducted to examine the causal relationships among latent variables in accordance with the research hypotheses. The assessment included R-square, effect size, collinearity diagnostics, predictive relevance based on SmartPLS procedures, and the significance of path coefficients through bootstrapping.

R-Square Test

The R-square value indicates the extent to which the independent variables explain the variance of the endogenous variables. The results of the R-square test are presented in Table 7.

Table 7. R-Square Test

Variable	R-Square	Adjusted R-Square
Work Motivation	0.857	0.854
Cadre Performance	0.970	0.970

Source: SmartPLS 4.0 output, 2025.

The R-square value for work motivation is 0.857, indicating that training and incentives explain a substantial proportion of the variance in work motivation. Meanwhile, the R-square value for cadre performance is 0.970, indicating that training, incentives, and work motivation jointly explain a very large proportion of variance in performance.

Although this result indicates very strong explanatory power, the R-square value for performance is exceptionally high for social science research. Therefore, it should be interpreted cautiously. Such a high value may be influenced by the homogeneous characteristics of the respondents, the use of self-reported questionnaire data, and the possibility of common method variance. To reduce the risk of overinterpretation, this study also examined reliability, discriminant validity, collinearity diagnostics, and predictive assessment. The findings should therefore be understood as highly context-specific and should not be generalized beyond the PERDHAKI malaria cadre setting without further comparative testing.

Predictive Relevance

Predictive relevance was assessed using the predictive assessment procedure available in SmartPLS 4.0, rather than by manually calculating Q^2 from R-square values. This correction was made because predictive relevance in PLS-SEM should be evaluated using cross-validated predictive procedures such as blindfolding or PLSpredict, not by deriving Q^2 manually from R-square statistics.

Table 8. Predictive Relevance Test

Endogenous Construct	Q^2 Value from SmartPLS	Remarks
Work Motivation	0.612	Predictive relevance supported
Cadre Performance	0.741	Predictive relevance supported

Source: SmartPLS 4.0 output, processed 2025.

The results show that the Q^2 values for work motivation and cadre performance are greater than zero. This indicates that the model has predictive relevance for both endogenous constructs. However, given the very high R-square value for cadre performance, the predictive results should still be interpreted with caution. The high explanatory and predictive values may reflect strong relationships among constructs within a homogeneous sample, but they may also suggest the need for further validation using different samples, objective performance indicators, or longitudinal data.

Hypothesis Testing

Hypothesis testing was conducted to examine both direct and indirect effects among latent variables using SEM-PLS with SmartPLS 4.0. Hypothesis testing was carried out by examining the path coefficient, t-statistic, p-value, confidence interval, and effect size obtained from the bootstrapping procedure. A hypothesis is accepted when the t-statistic is greater than 1.96 and the p-value is less than 0.05.

Direct Effects Testing

The results of direct effects testing among latent variables are presented in Table 9.

Table 9. Results of Direct Effect Hypothesis Testing

Relationship Between Variables	Path Coefficient	T-Statistic	P-Value	Lower Bound	Upper Bound	F-Square
Training → Work Motivation	0.425	5.825	0.000	0.308	0.613	0.283

Incentives → Work Motivation	0.530	6.778	0.000	0.331	0.650	0.441
Work Motivation → Cadre Performance	0.170	4.021	0.000	0.086	0.256	0.140
Training → Cadre Performance	0.617	16.808	0.000	0.538	0.682	2.251
Incentives → Cadre Performance	0.230	4.385	0.000	0.130	0.337	0.227

Source: SmartPLS 4.0 output, processed 2025.

The results show that all direct relationships are positive and statistically significant. First, training has a positive and significant effect on work motivation, with a path coefficient of 0.425, a t-statistic of 5.825, and a p-value of 0.000. This indicates that better training is associated with stronger work motivation among malaria cadres. The f-square value of 0.283 indicates a moderate to large effect.

Second, incentives have a positive and significant effect on work motivation, with a path coefficient of 0.530, a t-statistic of 6.778, and a p-value of 0.000. This result suggests that incentives play an important role in strengthening cadres' motivation. The f-square value of 0.441 indicates a large effect.

Third, work motivation has a positive and significant effect on cadre performance, with a path coefficient of 0.170, a t-statistic of 4.021, and a p-value of 0.000. Although significant, the effect size is relatively smaller than the effects of training and incentives, as reflected in the f-square value of 0.140.

Fourth, training has a positive and significant effect on cadre performance, with a path coefficient of 0.617, a t-statistic of 16.808, and a p-value of 0.000. This is the strongest direct relationship in the model, with an f-square value of 2.251, indicating a very large effect. This finding suggests that training is the most important determinant of malaria cadre performance in this study.

Fifth, incentives have a positive and significant effect on cadre performance, with a path coefficient of 0.230, a t-statistic of 4.385, and a p-value of 0.000. The f-square value of 0.227 indicates a moderate effect. This result shows that incentives contribute to performance improvement, although their effect is weaker than that of training. Thus, all direct effect hypotheses are supported.

Indirect Effect Testing

Indirect effect testing was conducted to examine the mediating role of work motivation in the relationship between training and incentives and malaria cadre performance. Mediation analysis was evaluated using the indirect effect coefficient, t-statistic, p-value, confidence interval, and mediation effect size. The results are presented in Table 10.

Table 10. Results of Indirect Effect Hypothesis Testing

Mediated Relationship	Indirect Effect	T-Statistic	P-Value	Lower Bound	Upper Bound	Upsilon (v)	Interpretation
Training → Work Motivation → Cadre Performance	0.072	2.910	0.004	0.031	0.130	0.005	Significant, small mediation
Incentives → Work Motivation → Cadre Performance	0.090	3.816	0.000	0.047	0.142	0.008	Significant, small mediation

Source: SmartPLS 4.0 output, processed 2025.

The results indicate that work motivation significantly mediates the relationship between training and cadre performance. The indirect effect of training on performance through work motivation is 0.072, with a t-statistic of 2.910 and a p-value of 0.004. The confidence interval ranges from 0.031 to 0.130 and does not include zero, indicating that the mediation effect is statistically significant. However, the upsilon value of 0.005 indicates that the magnitude of the mediation effect is small. This suggests that training improves performance more strongly through direct competence-based mechanisms than through motivational pathways.

Work motivation also mediates the relationship between incentives and cadre performance. The indirect effect of incentives on performance through work motivation is 0.090, with a t-statistic of 3.816 and a p-value of 0.000. The corrected confidence interval ranges from 0.047 to 0.142 and does not include zero, indicating that the mediation effect is statistically significant. Nevertheless, the upsilon value of 0.008 shows that the mediation effect remains small.

Overall, these findings show that work motivation functions as a significant mediating variable in the relationships between training, incentives, and cadre performance. Nevertheless, the relatively small mediation effect sizes indicate that the direct effects of training and incentives are stronger than their indirect effects through work motivation. This suggests that performance improvement among malaria cadres is influenced more strongly by structural and operational interventions, such as competency-based training and incentive clarity, than by motivational mechanisms alone.

Discussion

The Role of Training in Enhancing Work Motivation

The findings indicate that training positively influences the work motivation of malaria cadres, suggesting that training serves not only as a mechanism for transferring knowledge and skills but also as a psychological intervention that strengthens commitment and engagement. This result is consistent with Self-Determination Theory, which explains that competence is one of the fundamental psychological needs underlying intrinsic motivation (Ryan & Deci, 2020). Training increases individuals' perceptions of competence, mastery, and self-efficacy, which subsequently strengthen willingness to perform work-related responsibilities.

From a human resource management perspective, training is expected to enhance knowledge, skill development, and behavioral readiness for work performance (Dessler, 2020; Noe, 2020; Armstrong & Taylor, 2020; Mangkunegara, 2020). The science of training further suggests that effective training programs should involve experiential learning, practical application, and opportunities for transfer into workplace settings (Salas et al., 2015). Training effectiveness therefore depends not merely on exposure to information but on whether acquired knowledge can be transformed into actual work behavior (Blume et al., 2010; Blume et al., 2019).

The present finding is consistent with empirical studies reporting that relevant and context-specific training significantly increases work motivation and performance (Lestari & Afifah, 2020; Uslu et al., 2021; Arfandi & Candra, 2024; Anton, 2024). However, previous research has also shown inconsistent findings, indicating that training may have limited effects when programs are overly theoretical or disconnected from actual work demands. These differences suggest that training effectiveness depends strongly on contextual relevance and implementation quality.

In malaria-control programs, this issue becomes particularly important because cadres operate in challenging field conditions that require practical competence and continuous adaptation. WHO reports emphasize that community health workers function as essential links between health systems and communities and therefore require ongoing capacity strengthening

to sustain service quality (World Health Organization, 2021; World Health Organization, 2024). Studies conducted among community health workers similarly indicate that sustained capacity-building interventions improve confidence, motivation, and service delivery quality (Kok et al., 2017; Buback et al., 2025; Ndalama et al., 2025). Therefore, training should be viewed not only as a learning activity but as a strategic human resource intervention that simultaneously strengthens competence and motivational readiness.

The Influence of Incentives on Work Motivation

The positive effect of incentives on work motivation indicates that external reinforcement continues to play an important role in community-based health systems. Expectancy theory explains that motivation increases when individuals perceive a clear connection between effort, performance, and valued rewards (Robbins & Judge, 2020). Likewise, incentive theory suggests that rewards reinforce desired behavior and stimulate effort toward organizational objectives (Prendergast, 1999).

The present findings support previous studies demonstrating that incentives positively affect work motivation and performance when rewards are perceived as fair, meaningful, and connected to work outcomes (Chen et al., 2022; Pratama, 2021; Santri et al., 2023; Arfandi & Candra, 2024; Ghasemi & Shakerian, 2025). Similar evidence from community health worker contexts indicates that financial compensation contributes positively to motivation, retention, and performance outcomes (Glenton et al., 2021; Okech et al., 2025).

However, incentives do not automatically generate motivation. Previous studies indicate that incentive systems may become ineffective when rewards are perceived as inadequate, delayed, inconsistent, or unrelated to workload and actual contribution (Ormel et al., 2019; Witter et al., 2012; Zaresani & Scott, 2021). Thus, motivational responses depend not only on the amount of compensation but also on perceived fairness and recognition.

For malaria cadres, incentives carry dual meanings. Economically, they compensate time and effort invested in field activities. Psychologically, they symbolize appreciation and recognition of social contribution. Since malaria cadres generally work outside formal employment structures, recognition mechanisms become particularly important in sustaining commitment and motivation.

Work Motivation as a Determinant of Performance

Work motivation positively affects cadre performance, although its effect is relatively weaker than the direct effects of training and incentives. Motivation influences persistence, discipline, willingness to exert effort, and commitment toward organizational goals (Ryan & Deci, 2020; Robbins & Judge, 2020). Previous studies have similarly demonstrated positive relationships between motivation and work outcomes (Darmawan, 2022; Wang et al., 2024).

Nevertheless, the relatively modest influence of motivation observed in this study indicates that motivation alone may be insufficient for explaining performance in malaria-control settings. Community health worker performance emerges from the interaction of multiple structural and behavioral determinants, including competence, supervision, incentives, resources, workload, and community support (Kok et al., 2015; Glenton et al., 2021; Zulkarnaen & Mismarini, 2022; Okech et al., 2025).

This finding refines traditional motivational assumptions by suggesting that motivation operates within broader organizational systems. In highly operational public-health environments, motivated cadres may still experience performance limitations due to resource shortages, logistical barriers, and field constraints.

Direct Effect of Training on Performance

Training demonstrated the strongest direct effect on malaria cadre performance, indicating that competency development constitutes the primary driver of performance

improvement. Training improves technical skills and procedural accuracy, which are critical for malaria-related activities including case detection, reporting, and community education.

This result supports transfer-of-training theory suggesting that performance improvement occurs when knowledge acquired during training is successfully applied to practical work settings (Blume et al., 2010; Blume et al., 2019). It also aligns with studies emphasizing that training programs improve performance when they are practical, relevant, and aligned with job requirements (Lestari & Afifah, 2020; Uslu et al., 2021; Anton, 2024).

Within malaria contexts, technical competence is particularly critical because service errors may directly influence disease management outcomes and intervention effectiveness (Odaga et al., 2021; World Health Organization, 2022; Prameswari et al., 2025). Therefore, training contributes directly to performance because it enhances cadres' practical abilities and readiness to perform operational tasks effectively.

Direct Effect of Incentives on Performance

The positive effect of incentives on performance suggests that rewards function as reinforcing mechanisms rather than primary determinants of work outcomes. Incentives stimulate work discipline, attendance, effort, and target achievement.

The findings support studies reporting that incentive systems improve health worker performance when rewards are linked to measurable outcomes and perceived as equitable (Chen et al., 2022; Santri et al., 2023; Zaresani & Scott, 2021). However, evidence also suggests that incentives alone are insufficient to sustain long-term performance without accompanying organizational support systems (Ormel et al., 2019; Witter et al., 2012).

In malaria elimination programs, excessive emphasis on output-based incentives may unintentionally encourage quantity-oriented behavior at the expense of service quality. Therefore, incentive mechanisms should be linked not only to output quantity but also to reporting quality, adherence to procedures, community engagement, and continuity of service delivery.

The Mediating Role of Work Motivation

The study demonstrates that work motivation significantly mediates the effects of training and incentives on cadre performance, although the mediation effect remains relatively weak. This finding suggests that motivation acts as a behavioral mechanism connecting organizational interventions and work outcomes, but it does not represent the dominant pathway.

The relatively limited mediation effect may be explained by the operational characteristics of malaria cadre work, which require specific competencies, field resources, supervision, and procedural support. Thus, training can directly improve performance through competence enhancement, while incentives can directly strengthen discipline and target orientation.

This finding extends human resource management literature by suggesting that the mediating role of motivation is context-dependent rather than universally dominant. Motivation functions together with structural and operational mechanisms. Therefore, improving malaria cadre performance requires integrated interventions combining training, incentives, supervision, and organizational support rather than isolated motivational approaches.

5. Conclusions

This study demonstrates that training and incentives significantly improve the performance of malaria cadres in Jayapura City, both directly and indirectly through work motivation. Among the examined variables, training has the strongest effect on performance, indicating that competency-based interventions are central to strengthening community-based malaria control programs. Incentives also contribute positively, although their role is more supportive and reinforcing than dominant.

The main theoretical contribution of this study lies in its finding that work motivation acts as a significant but relatively weak mediator in the relationships between training, incentives, and cadre performance. This finding indicates that, in the context of malaria programs, performance is shaped more strongly by direct structural and operational mechanisms than by indirect psychological pathways. Thus, the study extends human resource management literature by showing that the mediating role of motivation is context-dependent, particularly in community-based health systems with high technical and operational demands.

Practically, the findings suggest that malaria programs should prioritize continuous, field-oriented, and competency-based training. Incentive systems should be fair, transparent, and linked to measurable performance indicators. In addition, motivational enhancement should be integrated with supervision, feedback, recognition, and operational support rather than treated as a standalone intervention.

This study has several limitations. First, the use of a single and relatively homogeneous sample limits the generalizability of the findings. Second, the reliance on self-reported data may increase the risk of common method bias. Third, the model does not include broader organizational factors such as leadership, supervision quality, workload, work environment, and institutional support. Future research should employ longitudinal designs, include objective or multi-source performance data, compare different malaria-endemic regions, and integrate broader organizational and contextual variables to provide a more comprehensive understanding of community health worker performance.

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