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Strengthening public health graduate competencies through field-based learning: A case study at Diponegoro University

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ABSTRACT

Field-Based Learning Practice (FBLP) has become a key component in the curriculum of the Faculty of Public Health, Diponegoro University. This learning model emphasizes hands-on experience through community engagement, aiming to bridge the gap between theory and real-world health challenges. However, evidence remains limited on how public health competencies are systematically demonstrated and assessed within structured field-based learning outputs. FBLP places students directly in community settings, where they engage in a structured problem-solving cycle that includes problem identification, root cause analysis, and the design and implementation of intervention strategies. This study adopts a descriptive case study approach to analyze 20 student group reports from FBLP conducted between 2023 and 2024. Data were collected through documentation review, using the Problem-Solving Cycle stages and Knowledge–Attitude–Practice (KAP) indicators as analytical lenses to assess competency evidence. Findings show that FBLP significantly strengthens both technical and interpersonal competencies. Across reports, students most consistently demonstrated competency in problem prioritization (MCUA), determinant-based causal analysis (fishbone/Blum framework), and action planning, while monitoring and evaluation were less consistently documented. Students demonstrated improved problem-solving abilities, a deeper understanding of public health dynamics, and better readiness to work in multidisciplinary environments. The application of Multiple Criteria Utility Assessment (MCUA), Fishbone, and How-How analysis methods enriched learning and supported holistic intervention design. This study contributes methodological insight by demonstrating how report-based indicators can be used to evaluate competency development within a structured field-learning cycle, with implications for curriculum design and competency-based assessment. FBLP has proven to be an effective pedagogical strategy for preparing students to respond to the complex demands of public health practice. This model may serve as a reference for other institutions seeking to enhance competency-based education through experiential learning.

Keywords: field-based learning practice, public health competencies, soft skills, Diponegoro University

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INTRODUCTION

Public health education plays a vital role in preparing competent graduates who can address real-world health challenges. To achieve this, students must go beyond theoretical learning and engage in practical, field-based experiences. One effective approach implemented is Field-Based Learning Practice (FBLP), where students interact directly with the community to address existing health problems (Dearnley et al., 2013).

The Faculty of Public Health at Diponegoro University incorporates this approach into its curriculum by engaging students in a structured problem-solving cycle that involves identifying health issues, analyzing root causes, and developing appropriate interventions. This cycle is designed to strengthen applied competencies that are repeatedly highlighted in global workforce

frameworks, including interdisciplinary communication and collaboration (Greenberg et al., 2017; Schleiff et al., 2020).

In addition to strengthening students' technical knowledge, FBLP also cultivates soft skills, including time management, critical thinking, and empathy. These are crucial attributes for public health professionals operating in complex, real-life settings (Mansholt et al., 2020). International public health education debates increasingly emphasize that these competencies cannot be developed through classroom instruction alone and therefore promote collaborative and community-engaged learning as a way to align education with societal needs (Horigian et al., 2023a; Solehuddin & Budiman, 2019; Strudsholm & Vollman, 2021).

In practice, Diponegoro University students are assigned to communities to address various health cases. This immersive exposure enhances their understanding of theoretical concepts and stimulates the development of contextually relevant solutions (Rissi & Gelmon, 2014). This aligns with global trends that highlight the value of integrating real-life practice into academic curricula to produce graduates who are both knowledgeable and adaptable (Watts et al., 2021). However, evidence remains limited on how competency development is systematically demonstrated and assessed within FBLP models, particularly through structured problem-solving stages documented in student outputs.

FBLP also provides opportunities for students to apply principles of epidemiology, health promotion, and program management in an integrated manner. Through primary data collection and participatory planning, students engage in evidence-based interventions and navigate field challenges such as limited resources and social dynamics. This process shapes them into problem solvers, negotiators, and facilitators, equipped to work with diverse stakeholders (Murniati et al., 2024; Napier & Simister, 2017; Buregyeya et al., 2021). Nevertheless, prior studies often emphasize outcomes in general terms, with fewer studies describing the indicators used to evaluate learning outputs across cohorts and problem contexts.

Therefore, this study seeks to investigate (1) the implementation of problem-solving cycles within FBLP, (2) the types of health cases students encounter, and (3) the effectiveness of the solutions they develop. Furthermore, this study assesses the impact of FBLP on students' technical and soft skill development using documented evidence from group reports as an analytical framework. Specifically, the analysis centers on how student outputs reflect competency development across stages of the problem-solving cycle and within a knowledge–attitude–practice (KAP) framework aligned with the Indonesian National Qualification Framework (INQF).

METHOD

This descriptive case study investigated the implementation of FBLP in enhancing student competencies at the Faculty of Public Health, Diponegoro University. The objective was to elucidate the application of the problem-solving cycle, the health cases encountered, and the development and implementation of solutions by students. The study employed document-based educational evaluation to ascertain evidence of competency development within student outputs.

This study is positioned within a post-positivist qualitative paradigm, which assumes that educational processes and competency development can be examined through systematic and transparent analysis of observable evidence, while recognizing that learning outcomes are shaped by context and may not be fully captured as objective "truth." Researcher reflexivity is important in this study because the analysis relies on the interpretation of student reports as learning artefacts, and therefore, the researchers acknowledge their role in defining indicators, interpreting evidence, and drawing conclusions. This paradigm supports the use of structured analytical criteria to reduce subjectivity while maintaining sensitivity to the real-world setting in which FBLP is implemented.

The study used a descriptive design, focusing on how students interact with communities and develop competencies that may not be captured through quantitative measures. This approach enabled researchers to analyze the real-world context of student learning, including the enhancement of both technical and soft skills. The research design also distinguishes between the

FBLP learning process (students' field activities) and the research evaluation process (researchers' document analysis of student outputs).

This study utilized the report documents of 20 student groups in field-based learning practice (FBLP) activities. Eighteen reports were drawn from 2024, while two reports from 2024 were excluded because they were incomplete. To maintain the intended sample size, two reports from 2023 were purposively included based on the criterion that the documents were complete and had been signed by the Head of the Study Program. These reports detailed the health problems identified, health problem prioritization, causes of health problems, intervention strategies, and implementation processes. Each report which documents fieldwork conducted in partner villages as part of the FBLP program was selected through purposive sampling to ensure that all documents contained the full sequence of the problem-solving cycle and sufficient information for analytical comparison across groups.

Data was gathered through document analysis of student reports, carried out through a series of structured steps. First, the researchers conducted a selection of eligible reports, ensuring each report met specific criteria related to the problem-solving cycle, which included problem identification, problem prioritization, root cause analysis, alternative solution, and implementation of intervention. Second, the researchers extracted relevant text segments and tables from each report according to predefined indicators for (a) problem-solving stages and (b) competency evidence. Furthermore, the researcher focuses on analyzing how field-based learning practices can strengthen the competence of public health graduates, including knowledge, attitude, and practice (KAP), as well as evidence of students' soft skills. All reports were anonymized at the village and group level before analysis to protect community and student identity.

Data analysis was carried out to see the suitability of the activities carried out by students in field-based learning practices, which refers to the problem-solving cycle process. The analysis described evidence of (1) identification and prioritization of public health problems, (2) root cause analysis, and (3) formulation and implementation of alternative solutions. To strengthen the methodological rationale, the document analysis applied a deductive coding framework based on two analytic domains: (a) problem-solving cycle indicators (problem identification, prioritization, causal analysis, solution design, implementation, and monitoring/evaluation where available) and (b) competency development indicators aligned with knowledge–attitude–practice (KAP) and supported by evidence of soft skills (e.g., teamwork, communication, leadership, and critical thinking). Coding was conducted iteratively across reports, and patterns were summarized across groups to identify recurring priorities, root causes, and intervention strategies. To enhance trustworthiness, a subset of reports was cross-checked by a second reviewer, and discrepancies in interpretation were resolved through discussion. The final analysis was carried out to assess the extent to which field-based learning practices were able to strengthen the competence of graduates in accordance with the needs of public health workers. This method allowed for a comprehensive understanding of how FBLP contributes to students' readiness for public health practice, particularly through experiential learning that integrates theoretical knowledge with real-world challenges.

FINDINGS AND DISCUSSION

Findings

FBLP refers to curricular activities that must be undertaken by students of the Faculty of Public Health at Diponegoro University. The purpose of FBLP activities is to enable students to identify health issues, ascertain their causes, determine appropriate solutions, implement interventions, and conduct monitoring and evaluation. Therefore, the FBLP activities are designed to enhance the competencies required of Bachelor of Public Health graduates in addressing real health challenges within the community. In this study, evidence of competency development is derived from a systematic analysis of 20 FBLP group reports, with attention to both the documented problem-solving stages and competency indicators.

In this paper, we present a study examining how FBLP activities were able to enhance the competencies of Bachelor of Public Health graduates. This study specifically focuses on the

components of FBLP activities implemented through the Problem-Solving Cycle approach, which has been integrated into the student learning process. The objective of this research is to evaluate the effectiveness of FBLP activities in strengthening competencies as demonstrated in student outputs across problem identification, prioritization, causal analysis, solution design, and implementation. Consequently, this paper will outline FBLP activities following the stages of the Problem-Solving Cycle.

Problem-solving cycle concept

Conceptually, the Problem-Solving Cycle is an approach to addressing public health issues that are rooted in real societal problems, and it emphasizes the importance of community participation in the resolution process. The following outlines the steps of the Problem-Solving Cycle as implemented by students during their FBLP activities. In the document analysis, these steps also function as analytic indicators used to evaluate students' application of systematic public health reasoning.

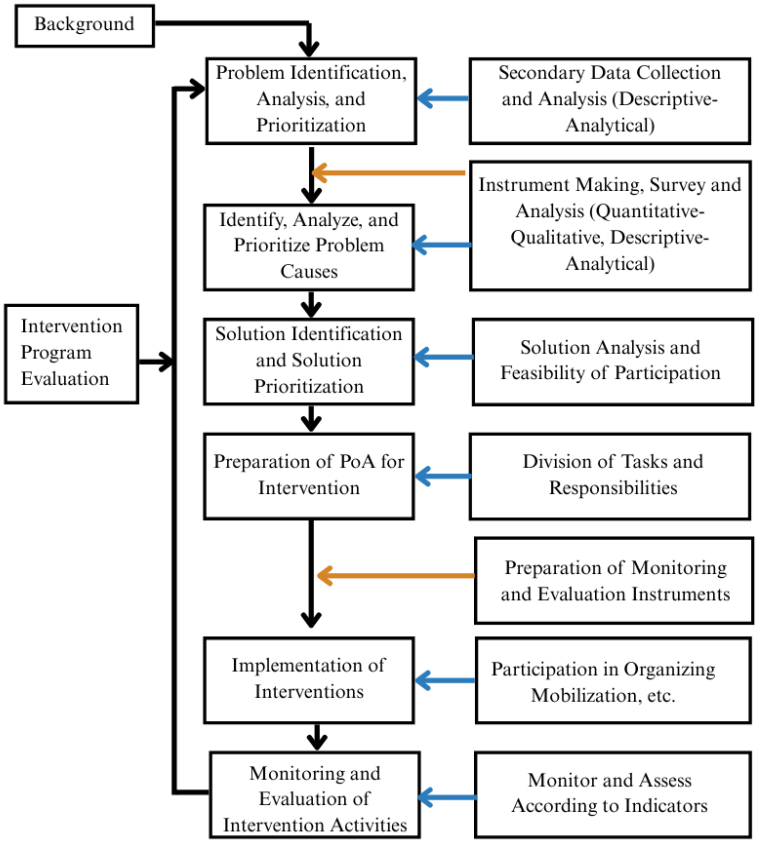

Figure 1. Problem-Solving Cycle Steps in FBLP Activities

Based on Figure 1, the actions undertaken by public health students in FBLP activities employed the Problem-Solving Cycle approach, utilizing a systematic thinking framework to address health issues within the community. Public health students gather data and information to identify significant health issues within the community through direct observation, literature reviews, surveys, and documentation studies from the local health center. Once the problem is identified, an in-depth analysis is conducted to determine the root cause through root cause analysis techniques or other relevant methodologies. Students then design multiple alternative solutions for implementation, and each alternative is assessed based on its effectiveness, feasibility, and potential impact on the community. From a range of alternatives, students select the most appropriate solution and develop a detailed implementation plan that includes the

necessary resources, a timeline, and indicators of success. Students begin to implement the selected solutions in the field in collaboration with relevant stakeholders such as local governments, health centers, and community organizations. Following implementation, an evaluation is conducted to assess the effectiveness of the solution, with students gathering outcome data to determine whether the intervention reduces or resolves the identified problem. Based on the evaluation results, students reflect on the processes that have been implemented and make necessary improvements for the next cycle or future projects. Across the analyzed reports, documentation was strongest for the stages from problem identification to solution implementation, while explicit monitoring, evaluation, and reflection were reported less consistently.

Identification and Priority Process

Problem identification activities in the FBLP for Public Health students consist of several sub-activities leading to the determination of the priority problem that will be addressed. Students commence their research by conducting field surveys, interviews, or observations to gather information directly from the community. This process involves assessing environmental health conditions, public health behaviors, and the accessibility and quality of health services. To complement primary data, students utilize secondary data from health offices, health centers, and other relevant literature sources. This data offers a broader historical perspective and context regarding existing health issues, which can aid in determining the urgency of the problem and the need for a solution.

After collecting the data, students analyze the health situation within the community. This step involves identifying risk factors, potential causes, and behavioral patterns that may impact health. Based on the results of the analysis, students compile a list of identified health problems and establish a priority scale. The determination of priorities is conducted by considering factors such as the level of urgency, the impact on the community, the availability of resources, and the potential for effective problem-solving. Based on the prioritization results, the problem identified as having the greatest impact and the highest level of urgency was selected as the primary focus of the intervention. This choice is intended to ensure that the solutions implemented yield substantial benefits in addressing real societal issues. Across reports, this prioritization stage provided the most consistent documentation of analytical reasoning because it was operationalized through a standardized tool (MCUA).

The results of the search for FBLP activity documents related to public health students involved determining problem priorities using the Multiple Criteria Utility Assessment (MCUA) method. This method serves as a basis for identifying the priority of problems based on their magnitude, urgency, and trends. Each student in the group provided an assessment, scoring from 1 to 4 according to the urgency (ranging from discomfort to death), the size of the problem (from not significant to very significant), and the trend (from decreasing to increasing). The final score is the group average. In this study, MCUA tables were treated as evidence of students' ability to apply structured decision-making and justification in prioritizing public health problems. An example of problem prioritization results is presented in Table 1.

Table 1. Results of issue priority using the MCUA method

Criterion	Weight (W)	Disease							
		Diabetes Mellitus		Hypertension		Acute Nasopharyngitis		Dyspepsia	
		Score (S)	Score x Wight (W)	Score (S)	Score x Wight (W)	Score (S)	Score x Wight (W)	Score (S)	Score x Wight (W)
The magnitude of the problem	35%	3.2	1.1	4.0	1.4	1.9	0.7	2.2	0.8
Urgency	45%	3.2	1.5	3.8	1.7	1.7	0.8	1.9	0.9
Trend	20%	1.0	0.2	4.0	0.8	4.0	0.8	2.0	0.4
Total			2.8		3.9		2.3		2.1
Priority			II		I		III		IV

Table 1 presents the results of the identification and prioritization for four major diseases: Diabetes Mellitus, Hypertension, Acute Nasopharyngitis, and Dyspepsia. This prioritization is based on three criteria: magnitude of the problem, urgency, and trend. Each criterion is assigned a different weight, with urgency receiving the highest weight at 45%, followed by the magnitude of the problem at 35%, and trend at 20%. The score for each disease is multiplied by its corresponding weight to generate a total score, which determines the priority of the intervention.

The results of the analysis indicated that hypertension was the highest priority disease (I) with the highest total score of 3.9. This ranking is attributed to elevated scores across all criteria, particularly in the critical areas of problem magnitude and urgency. Diabetes Mellitus ranked second (II) with a total score of 2.8, as it is regarded as a significant health issue with considerable urgency. In contrast, Acute Nasopharyngitis and Dyspepsia ranked third and fourth, respectively, with lower scores, suggesting that both conditions are perceived as less urgent than hypertension and diabetes mellitus.

Based on the analysis of the problem's priorities, the students (in groups) identified the following issues in order of importance: 1) hypertension, 2 diabetes mellitus, 3) acute nasopharyngitis, and 4) dyspepsia. Among these four priority problems, hypertension was selected as the primary focus for finding a solution. Overall, across the 20 FBLP reports analyzed, hypertension emerged as the most frequently prioritized public health problem, indicating a shared perception of its urgency and impact across different community contexts. Figure 2 shows the first-priority disease identified by the 20 groups in FBLP.

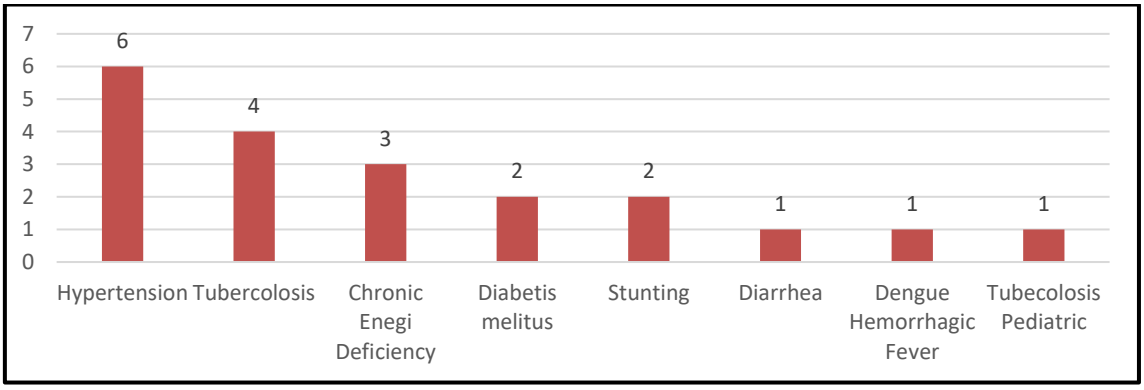

Figure 2. The Priority Diseases Identified by 20 Groups in FBLP

Based on Figure 2, it is known that hypertension is the most prioritized disease and is considered to be the main problem in society by 20 groups. This pattern suggests that students consistently recognized hypertension as a high-burden issue and were able to justify priorities using standardized criteria (MCUA). The Field-Based Learning Practice (FBLP) implemented at the Faculty of Public Health, Diponegoro University, has demonstrated a significant increase in students' technical and interpersonal competencies. This practice indicates that FBLP offers students direct exposure to real public health issues, such as disease identification and treatment, enabling them to apply theoretical knowledge to address health problems within the community. In the disease priority analysis (Table 1), hypertension was identified as the top priority based on high urgency and impact scores, followed by diabetes mellitus, acute nasopharyngitis, and dyspepsia. Importantly, the finding reflects students' competency in applying quantitative prioritization reasoning rather than merely selecting problems based on perception.

Analysis of the Causes of the Problem

Students analyze the causes of the problem using the Fish Bone Analysis method. In identification of the problem causes was based on H.L. Blum's health field concept. The disease is influenced by four major factors, namely: environmental factors, behavioral factors, health service factors, and genetic factors. The results of the students' causal analysis are illustrated in

Figure 3. In this study, fishbone diagrams were used as evidence of students' ability to apply causal reasoning and categorize determinants systematically.

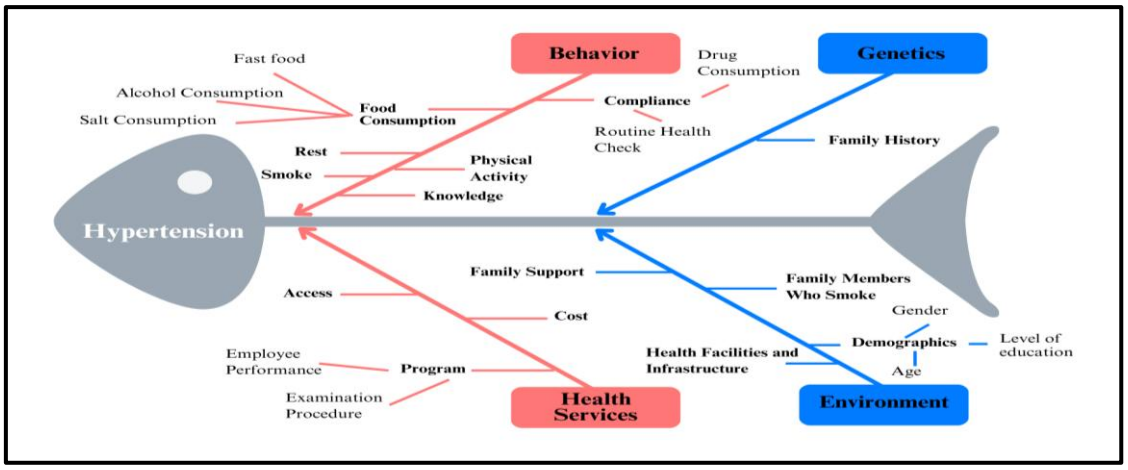

Figure 3. Analysis of the Cause of the Problem with the Fish Bone Analysis Method

This fishbone diagram outlines the causes of hypertension, categorized into four groups: environmental, behavioral, health services, and genetics. Environmental factors, such as exposure to secondhand smoke from family members who smoke and demographic variables (gender, age, education, socioeconomic status), significantly influence the risk of hypertension. Behavioral factors encompass the consumption of unhealthy foods (including fast food, alcohol, caffeine, and excessive salt), smoking habits, lack of physical activity, and non-adherence to regular check-ups, all of which contribute to an increased risk of hypertension. Health service factors, including limited access, high costs, and the quality of services, can impede effective hypertension treatment. The availability of exercise facilities and support from health programs is also crucial for better management of hypertension. Genetic factors, particularly a family history of hypertension, heighten an individual's susceptibility to the condition. These factors underscore the importance of a holistic approach to preventing and managing hypertension. After identifying several causes of the problem, an analysis of the priority causes of hypertension is conducted, focusing on urgency, seriousness, and feasibility. As a basis for determining the priority of the cause of the problem from the aspects of urgency, seriousness, and feasibility. Each group member assesses the causes on a scale from 1 to 4 based on urgency (ordinary to very important), seriousness (not important to very important), and feasibility (not easy to very easy). Each group member assessed causes on a scale of 1 to 4, and the final score was the group average. Table 2 presents the results. Across groups, behavioral determinants (physical inactivity and irregular blood pressure monitoring) were consistently prioritized, indicating students' tendency to focus on modifiable risk factors for intervention design.

Table 2. Results of priority calculation of root causes of health problems

Criterion	Weight (%)	Causes of Hypertension Disease					
		Exercise less than 3 times a week		Exposure to cigarette smoke		Has no tension record	
		S	BXS	S	BXS	S	BXS
Urgency	35	3	1.05	4	1.40	4	1.4
Seriousness	40	4	1.60	3	1.20	2	0.8
Feasibility	25	3	0.75	2	0.50	4	1.0
Total		3.4		3.1		3.2	
Ranking		I		III		II	

The results of the priority analysis indicated that exercising less than three times a week was the primary cause of Hypertension that required immediate attention, receiving the highest score of 3.4. The infrequency of exercise is deemed urgent and serious, as it can lead to various

health issues, including obesity and cardiovascular disease. Furthermore, the absence of blood pressure records ranked second, highlighting the importance of regular blood pressure monitoring for early detection of chronic diseases, particularly among vulnerable populations. These two factors underscore the necessity of enhancing public awareness regarding healthy lifestyles and the significance of personal health monitoring.

In contrast, the factor of exposure to cigarette smoke ranks last among the factors, despite its significant health impact. This factor is more challenging to address directly, as it is influenced by environmental and social habits. Therefore, it necessitates comprehensive policies, such as anti-smoking campaigns and regulations for public spaces. Overall, these results underscore the need for public health intervention priorities to focus on increasing physical activity and monitoring blood pressure, while also recognizing that preventing exposure to secondhand smoke remains a long-term concern. This pattern also suggests that students tended to prioritize determinants that were feasible for community-based intervention within the limited duration of field practice.

Determination of Alternative Problem Solving

Determining alternative solutions using the How-How Diagram encourages students to articulate, debate, and generate ideas for potential solutions to the selected problem. In the analysis, how-how diagrams were treated as evidence of students' ability to translate prioritized determinants into structured intervention options. An example of the diagram is shown in Figure 4.

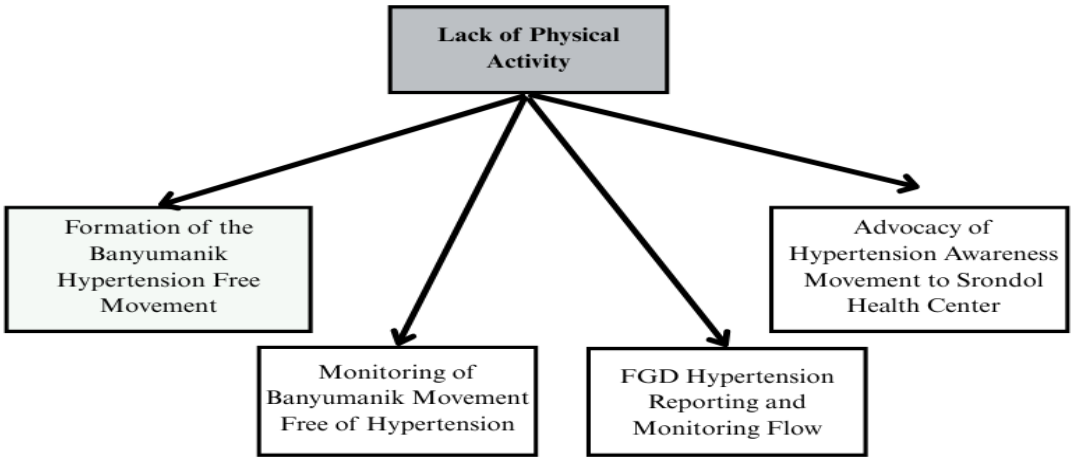

Figure 4. Analysis of Alternative Problem-Solving Strategies

The image illustrates the theme of alternative solutions to address the issue of "Lack of Physical Activity," which significantly contributes to the high prevalence of hypertension in Banyumanik Semarang City. This concern is critical, as low levels of physical activity are one of the primary risk factors for hypertension. Consequently, various alternative solutions are proposed in the drawings to enhance public awareness and encourage participation in physical activities as a preventive measure against hypertension.

The proposed alternative solutions encompass four primary approaches. First, the establishment of the "BABESI" (Hypertension-Free Banyumanik) movement aims to encourage community members to actively participate in physical activities. Second, there is periodic monitoring of the "BABESI" movement to assess its effectiveness and level of community participation. Third, it is proposed to implement a Focus Group Discussion (FGD) to develop a hypertension reporting and monitoring framework, ensuring community involvement in the health reporting process. Finally, advocacy efforts will be undertaken at the Srondol Community Health Center to support and promote the hypertension awareness movement.

Through these four alternative solutions, we aim to adopt a comprehensive approach to addressing the issue of insufficient physical activity that contributes to hypertension. Each

alternative targets a distinct aspect, ranging from raising awareness to involving health institutions, to foster an environment that promotes an active and healthy lifestyle. This strategy also highlights the synergy between community initiatives and the support of local health institutions in achieving shared health objectives. Across reports, similar solution patterns were observed, with many groups proposing community mobilization combined with health center engagement and health education activities.

Plan of Action

The Plan of Action (PoA) for hypertension intervention in Banyumanik Village aims to enhance community participation through the "BABESI" Movement which focuses on adolescents and housewives as the primary facilitators. This program provides ongoing education to improve public awareness of hypertension, present the Plan of Action, and foster collaboration in implementing activities that promote a healthy lifestyle and prevent hypertension. Utilizing training methods, in-depth interviews, and observations, this PoA supports monitoring and enables program adjustments based on field requirements. In the report analysis, PoA tables were treated as evidence of students' capacity to translate problem prioritization and causal analysis into actionable program planning.

Table 3. Plan of Action

Purpose	Targets/Objectives	Method
Increase community participation in the treatment of hypertension	Teenagers, housewives, people with hypertension, and the surrounding community	Formation of the management of the BABESI Movement; training and education; advocacy to the Village Head and Community Health Center
Monitor and evaluate program performance	"BABESI" members, people with hypertension, youth at risk, families of people with disabilities	In-depth interviews, hearings, observations, and lectures
Increasing health care awareness and public knowledge about hypertension	Health cadres and officers of the Srondol Health Center (Gasurkes)	Focus Group Discussion, creation of educational videos, and infographics
Getting support from the Srondol Health Center for the implementation of the program	Banyumanik Village Head, Head of Srondol Health Center	Advocacy meeting, Presentation, Collaboration on the Plan of Action

In addition to enhancing the capacity of health personnel through group discussions and visual educational media, this Plan of Action (PoA) also engages the Srondol Community Health Center in a formal dialogue with the Village Head to support various activities. This collaboration aimed to strengthen the synergy between the community and health facilities, thereby enabling more effective and sustainable hypertension treatment efforts in the Banyumanik area. Across reports, collaboration with local stakeholders (village leaders and Community Health Center) appeared as a recurring element, indicating students' competency in stakeholder engagement and negotiation.

Competency Achievement Analysis: Knowledge, Attitude, and Practice (KAP)

FBLP can facilitate the comprehensive development of students' competencies across three core domains aligned with the INQF for undergraduate education: Knowledge, Attitude, and Practice. In this study, KAP domains were operationalized through evidence documented in student reports (e.g., analytical reasoning in prioritization, ethical engagement descriptions, and implementation details), complemented by indicators of soft skills such as teamwork and communication.

Knowledge (Cognitive Domain)

Throughout the FBLP process, students exhibited enhanced cognitive competencies, particularly in the areas of public health theory application, epidemiological analysis, and health promotion planning. The integration of classroom knowledge into field analysis, such as identifying disease determinants and formulating intervention strategies, reflects higher-order thinking aligned with INQF Level 6, where graduates are expected to apply logical, critical, and innovative reasoning within their field of study. Across groups, the strongest cognitive evidence was reflected in the prioritization and causal analysis stages, which required explicit justification and structured reasoning.

Attitude (Affective Domain)

Field activities foster professional and ethical attitudes among students. Direct engagement with community members allows them to demonstrate empathy, cultural sensitivity, and ethical considerations in decision-making processes. These experiences support the development of the affective competencies required at the undergraduate level, including responsibility, social awareness, and respect for diversity attributes that are essential for public health professionals. However, affective competency evidence was often narrative and varied in detail across groups, suggesting the need for more standardized reflection prompts to strengthen documentation.

Practice (Psychomotor Domain)

In terms of practical skills, students demonstrated proficiency in data collection, stakeholder engagement, program implementation, and the application of participatory approaches to problem-solving. Their ability to design, execute, and evaluate interventions, such as the "BABESI" movement, reflects practical competency at Level 6, where students are expected to exhibit operational mastery in the field, including collaboration and adaptability in complex environments. Nevertheless, explicit monitoring and evaluation indicators were not consistently documented across reports, suggesting variability in how M&E stages were implemented or recorded.

Overall, the findings indicate that the FBLP has significantly contributed to the achievement of student learning outcomes across all three KAP domains, equipping graduates with the competencies necessary for effective public health practice. Across reports, recurring evidence included structured prioritization, determinant-based causal analysis, community-based solution design, and stakeholder collaboration, while documentation of monitoring, evaluation, and reflection was less consistent.

Discussion

Strengthening student competency through Field-Based Learning Practice practices (FBLP)

The findings of this study reinforce the effectiveness of Field-Based Learning Practice (FBLP) in enhancing student competencies through experiential, community-based education. This model prioritizes not only the transfer of theoretical knowledge but also the importance of hands-on experience in addressing tangible problems encountered by society. Through this approach, students become active participants in both the formulation and implementation of solutions in the field (UNDIP Public Health FBLP Team, 2019). Beyond confirming prior experiential learning studies, this study contributes evidence from systematic document analysis showing how competency development is demonstrated across structured problem-solving stages.

The implementation of Problem-Solving Cyle in FBLP is the main approach that must be conducted by the students Faculty of Public Health (as shown in Figure 1). The problem-solving cycle is a comprehensive approach to solving health problems in the community. This approach is grounded in experiential learning theory, which posits that effective learning occurs through cycles of concrete experience, reflection, conceptualization, and application (Kolb, 2015). A study conducted by Nuuyoma et al. (2022) demonstrates that students who engage in hands-on experience possess a deeper understanding of public health issues and are better equipped to develop solutions that are relevant to community conditions compared to who rely solely on classroom instruction (Nuuyoma et al., 2022). Similar findings were reported in a study by

Gonzalez-Argote et al. (2024), which emphasizes that experiential learning can enhance students' critical understanding and strengthen their problem-solving skills in a professional context (Gonzalez-Argote & Castillo-González, 2024). In this study, the documented use of standardized tools (MCUA, fishbone diagrams, and how–how analysis) demonstrates that the cycle was not only implemented as a pedagogical process but also produced measurable learning artefacts that reflect structured public health reasoning.

Implementation of the problem-solving cycle in FBLP

One of the approaches utilized in the Faculty of Public Health's FBLP at Diponegoro University is the Problem-Solving Cycle (Figure 1), which comprises five key stages: problem identification, root cause analysis, solution development, implementation, and evaluation. This methodology enables students to refine their analytical skills, engage in critical thinking, and make evidence-based decisions, thereby better preparing them to confront real-world challenges. However, the present study also reveals a nuance: documentation across the 20 reports was strongest for early and mid-cycle stages (problem identification through implementation), while explicit monitoring, evaluation, and reflection were less consistently reported, suggesting variability in how later stages are implemented or documented. Field-Based Learning Practice (FBLP) aligns with existing literature that indicates experiential learning enhances students' practical competencies, including analytical skills and evidence-based decision-making.

In this study, students utilize the Multiple Criteria Utility Assessment (MCUA) method to establish the priorities for health interventions within the community (as shown in Table 1). The analysis reveals that hypertension is a significant health issue that necessitates immediate attention. Prioritizing this problem can assist students in designing interventions that are pertinent to the community, while also enhancing their practical skills in disease management, community engagement, and collaborative problem-solving (Bürkin et al., 2024; Dearnley et al., 2013; Greenberg et al., 2017; Lander et al., 2019). This finding also shows that students were able to justify priorities using weighted criteria rather than relying on subjective preference, which reflects competency in evidence-informed decision-making.

These findings align with the study conducted by Watts et al. (2021), which emphasizes that non-communicable diseases, particularly hypertension, are increasingly becoming a significant concern in public health education. According to the World Health Organization (2022), the rising incidence of hypertension in developing countries necessitates the adoption of more effective learning methods. Engaging students in health intervention planning is a strategic approach to enhance the effectiveness of the implemented programs (Roadmap to Professionalizing the Public Health Workforce in the European Region, n.d.). In this context, the Diponegoro University case provides transferable insight into how competency-oriented field learning can be organized around standardized decision and planning tools, which may be adapted by other institutions with similar community partnerships.

In addition, the problem-solving approach in Project-Based Learning (PBL) is supported by research conducted by Burke, which found that students who are actively involved in addressing public health issues demonstrate a greater understanding of the social determinants of health and are more capable of developing evidence-based and contextually relevant interventions (Burke et al., 2022). Consistent with this, the FBLP reports analyzed in this study show that students explicitly categorized determinants and selected interventions that targeted modifiable risk factors (e.g., physical activity and monitoring behaviors), indicating applied competency in linking determinants to action.

Strengthening soft skills through FBLP

In addition to enhancing technical competence, the FBLP significantly contributes to the development of students' soft skills. Communication, collaboration, leadership, and the ability to work in multidisciplinary teams are essential skills that are refined through direct interaction with the community. In an increasingly complex and dynamic work environment, these skills are crucial for graduates to adapt to various professional challenges. The evidence for soft skill development in this study is reflected in the report documentation of group coordination,

stakeholder engagement activities, negotiation with community leaders, and collaborative planning with Community Health Center staff.

Studies conducted by Bürkin et al. emphasize that leadership and communication are essential competencies in public health education. This research indicates that students involved in community-based projects develop better interpersonal skills and are more prepared to navigate the dynamics of the health sector (Bürkin et al., 2024). Additionally, Horigian found that participation in community-based activities enhances students' abilities to adapt to field conditions and understand the perspectives of various stakeholders (Horigian et al., 2023a). The present study extends these findings by showing that soft skill indicators are embedded in the same problem-solving documentation used to assess technical competencies, suggesting that structured field outputs can capture both domains simultaneously.

Students who participate in the FBLP experience significant improvements in conflict resolution and data-driven decision-making skills. Interaction with the community often exposes students to complex situations that require problem-solving approaches that are not only rational but also consider the social and cultural aspects of the local community (Diningrat et al., 2020). This enriches the learning experience and helps shape students into more resilient health workers who are sensitive to the needs of the community. A study conducted by Plessas demonstrates that students' involvement in socially relevant scenarios enhances their empathy and understanding of the social factors that influence public health (Plessas et al., 2024). Furthermore, the problem-solving approach in PBLP is supported by research conducted by Burke, which found that students who are actively engaged in addressing public health issues develop a deeper understanding of the social determinants of health and are better equipped to create evidence-based and contextually appropriate interventions. However, this study also identifies a limitation: evidence of soft skill development depends largely on narrative reporting and may vary in depth across groups, indicating the need for more standardized reflective prompts or assessment rubrics to strengthen comparability. Authentic learning strategies promote deep cognitive engagement through real-world assignments, enabling students to gain meaningful experiences and insights into real-world challenges (Budi et al., 2024).

The effectiveness of collaborative approaches in FBLP

The results of this study indicate that students engaged in the Field-Based Learning Program (FBLP) are better equipped to work in multidisciplinary teams and possess enhanced analytical skills for addressing public health challenges. Previous studies have underscored the significance of aligning public health education with workforce needs, suggesting that practical field experience bolsters essential skills for the public health workforce (Krasna, 2021). The FBLP implemented in this study emphasizes a collaborative approach, where students not only work independently but also engage with various stakeholders, including healthcare professionals, academics, local government officials, and community members. This collaborative framework enables students to gain a more comprehensive understanding of the complexities surrounding public health issues and to develop more sustainable and contextually relevant solutions. Across reports, stakeholder engagement and collaboration were repeatedly documented through advocacy activities, formal coordination with village leaders, and joint planning with the Community Health Center, indicating that collaboration was not incidental but systematically embedded in the learning model.

Strudsholm and Vollman emphasized that a collaborative approach to public health education enhances students' preparedness for the workforce. Collaborating with various stakeholders enables students to appreciate diverse perspectives in health policy management and underscores the significance of a multidisciplinary approach in addressing public health challenges (Strudsholm & Vollman, 2021). Furthermore, the WHO (2022) highlights the importance of experience-based education in developing competent and adaptable public health professionals who can respond to evolving health service needs (Roadmap to Professionalizing the Public Health Workforce in the European Region, n.d.). Additionally, the study by Lim et al. underscores that an interdisciplinary approach in problem-based learning (PBL) can enhance effectiveness in tackling complex health issues, such as infectious diseases and disparities in

access to health services (Lim et al., 2024). Together, these sources support the interpretation that FBLP offers a scalable model when institutions have access to community partners and structured supervision to facilitate multidisciplinary engagement.

The results of this study indicate that students engaged in the FBLP are better equipped to work in multidisciplinary teams and possess enhanced analytical skills when addressing public health issues (Alsharyah et al., 2024). Consequently, this approach serves as an effective model for strengthening student capabilities and is relevant for implementation in various other public health education institutions. However, transferability requires specific enabling conditions, including strong institutional-community partnerships, clear field supervision, and structured reporting requirements to support consistent learning documentation. The collaborative nature of PBLP facilitates more effective knowledge transfer between students and the community, resulting in solutions that are more contextual and applicable (Günzel & Brehm, 2024).

Integration of Knowledge, Attitude, and Practice (KAP) in FBLP

The findings of this study also affirm that the Field-Based Learning Program (FBLP) significantly contributed to the development of students' competencies across the domains of Knowledge, Attitude, and Practice (KAP), in alignment with INQF for undergraduate education. Cognitive competencies were enhanced through the real-time application of epidemiological methods and program design, consistent with the expected outcomes at Level 6 of the INQF (Cui et al., 2023; Ghazali et al., 2024; Schleiff et al., 2020). The affective dimension was cultivated through continuous student engagement with diverse community groups, fostering empathy, ethical judgment, and cultural responsiveness, attributes essential for professional public health practice (Plessas et al., 2024; Horigian et al., 2023b). On the psychomotor level, students demonstrated proficiency in public health interventions, community mobilization, and program evaluation, showcasing their operational readiness to address complex health issues in real-life settings (Burke et al., 2022; Gonzalez-Argote & Castillo-González, 2024). Importantly, this study adds methodological value by demonstrating how KAP domains can be operationalized using report-based indicators within a structured problem-solving cycle, allowing competency evidence to be compared across cohorts and contexts. At the same time, the variability in documentation of monitoring and evaluation suggests an area for curricular strengthening, particularly through clearer M&E guidance and assessment rubrics.

CONCLUSION

The implementation of Field-Based Learning Practice (FBLP) at the Faculty of Public Health, Diponegoro University, was found to be effective in enhancing the competencies of public health students. By immersing students in real-life community settings and employing a structured problem-solving cycle, FBLP enables the integration of theoretical knowledge with practical application. This study contributes by providing a systematic document-based evaluation of how competency development is demonstrated across problem-solving stages (Habiburrahman & Putra, 2024) in student FBLP outputs.

The findings of this study demonstrate that FBLP strengthens not only technical skills such as health problem analysis, intervention design, and program evaluation but also soft skills, including communication, leadership, teamwork, and cultural sensitivity. The use of analytical tools like the MCUA, Fishbone Diagram, and How-How Diagram facilitated systematic decision-making and encouraged students to address health problems holistically. Across the analyzed reports, evidence was most consistently documented in problem prioritization, causal analysis, and action planning, while monitoring and evaluation evidence appeared less consistently, indicating an area for curricular strengthening.

Moreover, the incorporation of Knowledge, Attitude, and Practice (KAP) domains in the learning process ensures a well-rounded development of cognitive, affective, and psychomotor competencies aligned with national qualification standards. These competencies are essential for preparing graduates to work effectively in diverse and multidisciplinary public health environments. Methodologically, the study demonstrates that KAP domains can be

operationalized using report-based indicators embedded within the problem-solving cycle, enabling comparative assessment across student groups.

FBLP also fosters collaboration between students and community stakeholders, reinforcing Kingsley (2025) and Lori et al. (2025) concerns on the importance of participatory approaches in sustainable health development. The hands-on nature of the program not only improves student readiness for professional roles but also contributes to solving actual health issues in the field. However, because the analysis relied on student reports, the findings may be influenced by variability in reporting quality and do not directly measure competency outcomes through independent assessments or longitudinal tracking.

FBLP represents a transformative learning model that can serve as a reference for public health education programs seeking to strengthen graduate competencies through experiential, community-engaged learning (Kingsley, 2025). The model may be transferable to other institutions when supported by strong community partnerships, structured supervision, and standardized reporting and assessment guidelines. Future research may further explore its scalability, long-term impact, and adaptation in other educational or cultural contexts through mixed-method designs, multi-institution comparisons, and competency assessment tools that complement document analysis.

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