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Enhancing Posyandu Cadres' Role in Preventing Non-Communicable Diseases in Gonggang Village, Poncol District, Magetan Regency

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ABSTRACT Non-Communicable Diseases (NCDs) are increasingly prevalent in rural communities and represent a growing public health challenge, particularly in settings with limited access to preventive health services. Posyandu cadres, as frontline community health volunteers, play a critical role in the prevention and early detection of NCDs. However, insufficient competence and capacity among cadres often hinder the optimal implementation of promotive and preventive health efforts. This community service activity aimed to strengthen the role of Posyandu cadres by enhancing their competencies in NCD prevention and early detection in Gonggang Village, Poncol District, Magetan Regency. A participatory approach was employed, incorporating structured training sessions, continuous mentoring, and supervised field practice. The intervention focused on increasing cadres' knowledge of NCD risk factors, promoting Clean and Healthy Living Behavior (PHBS), and developing practical skills in early detection and community health monitoring. Program evaluation was conducted using a pre-test and post-test design to assess knowledge improvement, direct observation of cadre performance during Posyandu activities, and qualitative feedback from community members. The results demonstrated a substantial improvement in cadres' knowledge and practical skills related to NCD prevention and health education delivery. Cadres were able to independently initiate promotive and preventive activities, including healthy lifestyle campaigns, routine blood pressure measurements, and basic blood glucose monitoring during Posyandu services. Furthermore, active support from the local community and village government contributed to the continuity and sustainability of the program. In conclusion, strengthening the competence of Posyandu cadres through participatory training and mentoring is an effective strategy to enhance community-based NCD prevention efforts. This model shows strong potential for replication in other rural settings to support the ongoing transformation of primary healthcare services.

INDEX TERMS Posyandu cadres, Non-Communicable Diseases, Community empowerment, Health promotion, Primary healthcare.

I. INTRODUCTION

Non-Communicable Diseases (NCDs), including hypertension, diabetes mellitus, cardiovascular diseases, and cancer, continue to pose a major public health challenge in Indonesia and globally [1], [5]. Rapid lifestyle transitions characterized by urbanization, reduced physical activity, tobacco use, and increased consumption of foods high in sugar, salt, and fat have significantly accelerated the prevalence of NCDs over the past two decades [2], [8]. Recent regional data illustrate the severity of this problem; in Magetan Regency, approximately 29.7% of the population was reported to have hypertension in 2023, while the number of individuals diagnosed with diabetes mellitus reached 14,813 cases [3]. These figures reflect not only the growing burden of NCDs but also the urgent need for effective, community-based promotive and preventive interventions [4], [5].

Gonggang Village, located in Poncol District, Magetan Regency, presents distinctive geographical and socio-economic characteristics that influence community health outcomes. Covering an area of approximately 10.87 km² with a population of around 5,216 residents, the village is predominantly supported by agricultural and livestock-based livelihoods [3], [6]. Despite its considerable economic potential, including agriculture and rural tourism, access to modern healthcare facilities remains limited due to geographical barriers and suboptimal infrastructure [7]. These conditions increase community vulnerability to NCDs and limit early detection and continuous disease management.

The primary health challenge in Gonggang Village is the heightened risk of NCDs driven by unhealthy lifestyle behaviors, such as high-carbohydrate and low-fiber diets, smoking, and insufficient physical activity, compounded by limited access to primary healthcare services [8]. This situation is further exacerbated by the limited preparedness of Posyandu cadres in recognizing NCD risk factors and performing early detection activities. Although Posyandu cadres hold a strategic position as frontline agents of health

promotion at the community level, gaps in knowledge, skills, and confidence often constrain their effectiveness [9], [10]. Strengthening cadre capacity is therefore essential to enable meaningful collaboration with health centers and local health professionals in addressing NCD-related challenges [10].

State-of-the-art approaches to NCD prevention increasingly emphasize participatory, community-based capacity-building models that integrate structured training, mentoring, and field-based practice for community health volunteers [1], [4], [9]. Evidence indicates that such approaches enhance knowledge retention, practical screening skills, and motivation among cadres, while simultaneously increasing community engagement [13]–[15]. Furthermore, integrating education on Clean and Healthy Living Behaviors (PHBS) with simple screening techniques such as blood pressure and blood glucose measurements has been shown to improve early detection and awareness of NCD risks [16], [17].

Despite these advancements, a clear research and practice gap remains. Many existing studies focus on urban settings or formal healthcare providers, with limited empirical evidence evaluating structured capacity-strengthening programs for Posyandu cadres in rural and geographically constrained areas [18], [19]. Moreover, few initiatives comprehensively assess improvements across cognitive, psychomotor, and affective domains while also considering sustainability and alignment with Indonesia's primary healthcare transformation agenda [20].

Accordingly, this community service activity aims to increase the knowledge and skills of Posyandu cadres in the prevention and control of NCDs through participatory training, mentoring, and field practice in Gonggang Village. Cadres are expected to enhance their capacity for early detection of NCD risk factors, deliver effective health education on PHBS, and act as agents of behavioral change within the community, in line with promotive–preventive primary healthcare policies [1], [10], [21]. This study contributes in three main ways:

1. Providing empirical evidence on the effectiveness of participatory cadre capacity-building models in rural NCD prevention.
2. Demonstrating an integrated community-based approach that combines health education, early detection, and cadre empowerment.
3. Offering practical insights and recommendations for scaling up sustainable cadre-based NCD prevention programs aligned with primary healthcare transformation.

This article is organized as follows: Section II describes the methods and implementation of the community service program; Section III presents the results and outcomes; Section IV discusses the findings in relation to existing literature; and Section V concludes with implications and recommendations for sustainability and replication.

II. METHOD AND IMPLEMENTATION

This community service activity was conducted to strengthen the competence of Posyandu cadres in preventing and detecting Non-Communicable Diseases (NCDs) through a structured, participatory capacity-building approach. The methods were designed as a practical and replicable framework focusing on training delivery, mentoring processes, and outcome evaluation at the community level.

A. STUDY DESIGN AND RASIONALE

This activity employed a prospective, non-experimental community-based intervention design using a one-group pretest–posttest approach. The design was selected to evaluate changes in cadres' knowledge, skills, and attitudes following a structured intervention without the use of a control group. This approach is commonly applied in community empowerment and health promotion programs where randomization is impractical due to ethical and logistical constraints [22]. The design allows for direct comparison of outcomes before and after the intervention within the same group, thereby capturing the immediate effects of capacity-building activities.

B. STUDY SETTING

The program was implemented in Gonggang Village, Poncol District, Magetan Regency, East Java, Indonesia. The village is located in a mountainous rural area with limited access to secondary and tertiary healthcare services. Activities were conducted from April to September 2025, encompassing preparation, training, mentoring, field practice, and evaluation phases. Posyandu sites and community meeting halls were used as venues to ensure accessibility for all cadres and community members.

C. STUDY POPULATION AND SAMPLING

The study population consisted of Posyandu cadres actively serving in Gonggang Village. A total of 68 cadres participated in the program. Total sampling was applied, whereby all eligible cadres were included to maximize program coverage and community impact. Inclusion criteria were: (1) registered Posyandu cadres, (2) actively involved in community health activities, and (3) willingness to participate throughout the program. Cadres who were unable to attend training sessions or field practice were excluded. No randomization was performed, as the intervention targeted the entire cadre population as part of a community service mandate [23].

D. INTERVENTION DESIGN AND IMPLEMENTATION FRAMEWORK

The community service intervention was designed using a structured and sequential implementation framework to ensure systematic capacity building of Posyandu cadres in NCD prevention. The overall flow of the program is illustrated in FIGURE 1, which depict the logical sequence of activities from preparation to evaluation.

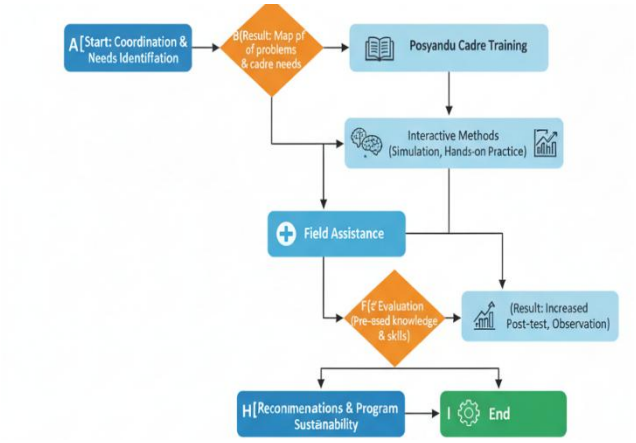

FIGURE 1. Flowchart of Posyandu Cadre Trining And Assistence Program for NCD Prevention

1. STAGE 1: COORDINATION AND NEEDS IDENTIFICATION

This stage involved coordination with village government officials, local health center staff, and Posyandu administrators to systematically map community health conditions and identify priority NCD-related problems. In addition, the readiness and needs of Posyandu cadres were assessed to determine gaps in knowledge and skills. The expected output of this stage was the identification of priority NCD problems and cadre competency needs, which served as the basis for designing targeted intervention activities.

2. STAGE 2: TRAINING OF POSYANDU CADRES

At this stage, structured training was provided to Posyandu cadres focusing on NCD risk factors, principles of Clean and Healthy Living Behaviors (PHBS), and basic technical skills. The training covered blood pressure measurement, simple blood glucose monitoring, and basic health counseling techniques. The expected output of this stage was an improvement in cadres' basic knowledge and technical competence related to NCD prevention and control.

3. STAGE 3: INTERACTIVE LEARNING METHODS

Training activities in this stage were delivered through lectures, group discussions, simulations, and hands-on practice using simple medical devices. This approach aimed to facilitate experiential learning and enhance cadres' understanding of the training materials. The expected output of this stage was improved comprehension of NCD prevention concepts and increased ability of cadres to correctly perform practical skills.

4. STAGE 4: FIELD ASSISTANCE AND MENTORING

This stage involved direct accompaniment and mentoring of cadres during Posyandu services and selected home visits. Health workers and the community service team provided on-site guidance to ensure correct application of skills and adherence to standard procedures. The expected output of this stage was the ability of cadres to independently and accurately apply acquired skills in real community service settings.

5. STAGE 5: MONITORING AND EVALUATION

Monitoring and evaluation were conducted through pretest and posttest assessments of knowledge, direct observation of cadres' skills, and the collection of feedback from community members. This stage aimed to measure the effectiveness of the intervention. The expected output of this stage was documented evidence of increased knowledge and improved practical skills among Posyandu cadres.

6. STAGE 6: RECOMMENDATIONS AND SUSTAINABILITY PLANNING

The final stage focused on formulating program recommendations based on evaluation findings to support sustainable strengthening of cadre roles. This included planning for continued implementation of NCD prevention activities at the village level. The expected output of this stage was the development of a sustainability strategy to ensure the continuity of community-based NCD prevention programs.

E. DATA COLLECTION INSTRUMENTS AND PROCEDURES

Data collection focused on three domains: knowledge, skills, and attitudes. Knowledge was assessed using a structured questionnaire developed from validated NCD education instruments and adapted to the local context. Skills were evaluated through direct observation using a standardized checklist covering blood pressure measurement, blood glucose screening, and health counseling techniques. Attitudes were assessed using a Likert-scale questionnaire measuring motivation, confidence, and commitment to NCD prevention activities. A pretest was administered prior to training to establish baseline data. The posttest was conducted after the mentoring and field practice phase. Observations were performed during Posyandu sessions by trained evaluators to ensure consistency. Community feedback was also collected informally to support qualitative interpretation of outcomes [24].

F. DATA ANALYSIS

Quantitative data were entered and analyzed descriptively using percentage changes to compare pretest and posttest results across the three domains. Improvements were calculated as relative increases from baseline values. Observational and qualitative feedback data were summarized narratively to complement quantitative findings. This mixed descriptive approach is appropriate for community-based interventions focused on capacity building rather than hypothesis testing [25].

G. ETHICAL CONSIDERATIONS

Information is not available.

III. RESULT

FIGURE 2. Community Service Team and Posyandu cadres of Gonggang Poncol Magetan village

FIGURE 2 illustrates the collaboration between the community service team and Posyandu cadres in Gonggang Village, Poncol District, Magetan Regency, during the implementation of the program. This initial engagement reflects the participatory approach adopted in the community service activity, emphasizing mutual coordination, active involvement of local health volunteers, and shared commitment to strengthening community-based non-communicable disease (NCD) prevention efforts. The interaction between the academic team and Posyandu cadres formed the foundation for subsequent training, mentoring, and field-based activities aimed at enhancing cadres' competencies in promotive and preventive health services

This activity took place in Gongang Village, Poncol District, Magetan Regency, from April to September 2025. The implementation consists of the preparation stage, the implementation of training, mentoring, as well as continuous evaluation and monitoring.

Activity Stages and Activity Details

1. Preparation : Before implementation, training materials were prepared as well as logistics and human resource planning. The sprit from the analysis of the situation of villages with a majority of elderly residents and an increasing number of NCDs became the basis for the program design. Preparation in a study is indispensable in ensuring smooth.
2. Training implementation : This training was attended by 68 Posyandu cadres from various hamlets in Gonggang Village, and involved 25 village leaders and the Heads of RT/RW. The material includes the concept of primary service transformation, early detection of NCDs, PHBS, and health communication.
3. Mentoring : After the training, regular assistance was provided from health professionals and academics to strengthen the skills of cadres in daily practice, including home visits, health checks, and citizen monitoring. This assistance aims to increase the confidence and consistency of cadres in carrying out their duties as agents of change.
4. Monitoring evaluation : The results of the evaluation through the pre-test and post-test showed an increase in knowledge by 65%, skills.

TABLE 1
Achievement Data and Percentage of Increase

Aspects	Pre-test Average Score	Post-test Average Score	Percentage Increase	Information
Knowledge	52,0	85,8	65%	Significant improvement in understanding of PTM and PHBS
Skills	44,6	78,3	75,5%	Cadres are able to conduct blood pressure, blood sugar checks and health interview simulations with more confidence
Attitude	66,2	84,1	27%	Increased enthusiasm, increased confidence and high motivation to conduct field monitoring

From the TABLE 1, it can be seen that there is a significant increase in these three aspects after the implementation of the activity. Overall, this table shows that training activities, practicums, and field assignments succeeded in significantly increasing participant capacity in all aspects measured. The increase in knowledge aspect achievement by 65%, indicates that participants experienced a significant increase in understanding of materials related to PTM, PHBS, and primary service transformation through training and practicum activities. The skill pre-test score increased by 75.5%, indicating that participants became more proficient in performing simple checks such as blood pressure and blood sugar, as well as using early detection instruments more confidently after practicum and field assignments. The attitude value of the participants increased by 27%, which shows that the motivation, confidence, and enthusiasm of the participants in carrying out their tasks in the community increases, although the increase is relatively small compared to the increase in knowledge and skills.

The results and impact of the implementation of this activity showed a significant improvement in terms of knowledge, skills, and attitudes of cadres. In addition to individual improvement, the people of Gonggang Village are getting used to receiving cadre visits, taking basic health checks, and getting education about a healthy lifestyle. The

support from the village leaders and the Chairman of RT/RW strengthens the legitimacy.

Activity Stage	Implementation Time	Number of Participants	Form of Activity	Yield Achievement (%)	Information
FGD on the implementation of activities	April 2025	15 people	Focused discussion	Technical preparation of activities	Planning can be well prepared
Training	June 2025	68 Posyandu cadres, 25 officers & Head of RT/RW	Delivery of material on primary service transformation, early detection of NCDs, PHBS, health communication	Knowledge ↑ 65%	The results of the pre-test and post-test showed a significant increase in the understanding of cadres
Field Laboratory Practicum	June 2025	68 Posyandu cadres	Blood pressure check exercises, blood sugar checks, simulated health interviews, use of early detection instruments	Skill ↑ 45%	Cadres are able to practice technical skills more confidently
Field Assignment	June-July 2025 (after practicum)	68 Posyandu cadres	Home visit, citizen monitoring, simple inspection, PHBS education	Attitude ↑ 40%	Cadres show increased motivation and active involvement in society
Evaluation & Reflection	August-September 2025	A team of lecturers, health center staff	Discussion of implementation results, feedback, preparation of follow-up	-	The results of the achievement were agreed as progress of 65% of the program target

TABLE 2
Implementation of Community Service

FIGURE 3. Activities to provide material reviews about PTM

FIGURE 3 depicts the delivery of educational sessions on Non-Communicable Diseases (NCDs) to Posyandu cadres as part of the training phase of the community service program. The material review focused on increasing cadres' understanding of NCD risk factors, early detection methods, and the promotion of Clean and Healthy Living Behaviors (PHBS). This activity served as a foundational learning component that supported subsequent practical training and field mentoring, contributing to the observed improvements in cadres' knowledge and readiness to implement promotive and preventive health activities

The implementation of this service activity shows that increasing the capacity of Posyandu cadres in early detection of NCDs and promoting clean and healthy living behaviors (PHBS) has had a positive impact on the quality of services and community participation in Gonggang Village. The results of the evaluation showed a significant increase in both aspects of knowledge (65%), skills (45%), and attitudes (40%) (TABLE 2).

IV. DISCUSSION

The findings of this community service program demonstrate that strengthening the competence of Posyandu cadres is a critical factor in enhancing the effectiveness of community-based Non-Communicable Disease (NCD) prevention. The observed improvements in cadres' knowledge, technical skills, and confidence indicate that structured capacity-building interventions can substantially improve the implementation of promotive and preventive health programs at the village level. This finding is consistent with contemporary evidence emphasizing the strategic role of community health cadres as frontline actors in NCD prevention, particularly in settings with limited access to formal healthcare services [26], [29].

The training model implemented in this program, which integrated theoretical instruction, practical skills training, and direct field assistance, proved effective in strengthening cadres' competencies. Cadres demonstrated improved ability to identify NCD risk factors, conduct simple health examinations such as blood pressure and basic blood glucose measurements, and communicate health messages more persuasively to community members. These outcomes support previous studies showing that blended learning approaches combining classroom-based education with hands-on practice are more effective than purely didactic methods in improving cadre performance [27], [28]. Direct mentoring during Posyandu activities further reinforced learning by enabling cadres to apply newly acquired skills in real-world contexts under supervision.

Participatory learning methods played a significant role in increasing cadres' confidence and readiness to perform their duties. The use of group discussions, simulations, and role-play allowed cadres to actively engage with training materials and experience scenarios similar to those encountered during routine health services. This approach facilitated not only cognitive understanding but also practical problem-solving and communication skills. Similar findings have been reported in recent community empowerment studies, which indicate that participatory approaches enhance self-efficacy and motivation among health cadres, leading to more active and independent performance in the field [31], [33].

Beyond technical competence, the intervention contributed to the development of positive attitudes and internal motivation among cadres. Active involvement in training and service delivery fostered a sense of ownership and responsibility toward community health outcomes. This aligns with contemporary empowerment frameworks that emphasize the importance of psychological and motivational dimensions in sustaining community health interventions [29], [33]. Cadres who feel confident and valued are more likely to remain engaged and proactive in delivering health promotion and early detection activities.

The success of the program was also strongly supported by the involvement of key stakeholders, including village leaders, health center staff, and academic facilitators. Their participation enhanced the legitimacy of the program and encouraged broader community acceptance. The continuous guidance provided by health professionals ensured that cadres adhered to correct procedures and standards during service delivery. This collaborative approach is consistent with evidence highlighting that strong partnerships between communities, health services, and academic institutions are essential for the sustainability of community-based health programs [30], [34].

Multi-sectoral collaboration enabled the sharing of resources, expertise, and responsibilities, thereby strengthening the local health system. Previous studies have shown that community health interventions are more likely to achieve long-term impact when supported by active engagement from local authorities and health professionals [30], [31]. In this context, the collaborative framework implemented in Gonggang Village contributed significantly to the effectiveness and sustainability potential of the intervention.

Despite the positive outcomes observed, several limitations and challenges were identified. One major challenge concerns the sustainability of cadres' competencies after the completion of structured training and mentoring. Without ongoing support and periodic refresher training, there is a risk that knowledge and skills may decline over time. This limitation has also been reported in other community-based NCD prevention programs, which emphasize the necessity of continuous capacity-building efforts to maintain cadre performance [28], [31].

Another limitation relates to the scope of evaluation. While improvements in knowledge and skills were clearly documented, the program did not directly assess long-term behavioral changes within the community or reductions in NCD incidence. Such outcomes require longer follow-up periods and more comprehensive evaluation designs. Previous research suggests that improvements in cadre competence represent an important intermediate outcome, but sustained community engagement is necessary to translate these gains into measurable population-level health improvements [27], [22].

Challenges related to data recording and reporting were also identified. The program primarily relied on manual data collection methods, which can be inefficient and prone to error. Recent studies have highlighted the potential benefits of integrating simple digital health tools to support data management and monitoring in community-based health programs [33], [35]. However, the adoption of digital systems must consider local infrastructure, digital literacy, and resource availability to ensure feasibility and effectiveness.

The findings of this study have important implications for health policy and practice. Strengthening the competence of Posyandu cadres should be recognized as a strategic investment in primary healthcare transformation, particularly within promotive and preventive frameworks. Well-trained cadres can serve as effective intermediaries between health services and the community, facilitating early detection of NCD risk factors and promoting healthy behaviors [26], [22]. Policymakers are encouraged to integrate cadre capacity-building initiatives into routine primary healthcare programs, supported by continuous mentoring and stakeholder collaboration.

Furthermore, the intervention model implemented in this program offers a practical and replicable framework for other rural communities with similar socio-geographical characteristics. The staged approach beginning with needs assessment, followed by training, mentoring, evaluation, and sustainability planning provides a clear roadmap for strengthening community-based NCD prevention efforts. By adapting this model to local contexts, other regions may achieve comparable improvements in cadre competence and community health outcomes [32], [34].

Overall, this study reinforces the critical role of Posyandu cadres as key actors in community-based NCD prevention. Strengthening their competence through

participatory training, continuous assistance, and collaborative support systems not only enhances service delivery but also contributes to sustainable improvements in public health. Future programs should prioritize long-term support mechanisms, integration of appropriate technological innovations, and sustained multi-sectoral collaboration to maximize impact.

V. CONCLUSION

This community service program was conducted with the primary aim of strengthening the capacity of Posyandu cadres to support early detection of non-communicable diseases (NCDs) and to promote the independent adoption of Clean and Healthy Living Behaviors (PHBS) at the community level. The findings demonstrate that a structured intervention combining training, interactive learning methods, and continuous mentoring was effective in achieving this aim. The implementation of pretest–posttest evaluations and field observations indicated a measurable improvement in cadres' competencies, reflected in increased knowledge scores, enhanced technical skills in conducting simple health screenings such as blood pressure and blood glucose measurements, and improved attitudes toward their roles as community health facilitators. In practical terms, cadres were able to independently perform basic NCD screening activities, provide health counseling, and apply standardized recording procedures during Posyandu services and home visits, which represents a substantive functional improvement compared to baseline conditions prior to the intervention. These capacity gains contributed to observable community-level outcomes, including increased awareness of NCD risk factors, greater participation in routine health checks, and more consistent practice of PHBS among community members. From a policy perspective, the results underscore the strategic importance of Posyandu cadres as the frontline of primary healthcare services, indicating that systematic cadre empowerment should be institutionalized by village governments, primary health centers, and local health authorities as a sustainable component of community-based NCD prevention programs. The integration of cadre activities with digital health data recording and reporting systems is strongly recommended to improve monitoring accuracy, facilitate program evaluation, and support evidence-based decision-making. In terms of future work, further research is needed to assess the long-term impact of cadre capacity building on key public health indicators, to compare the effectiveness of different training and mentoring models across diverse settings, and to explore socio-cultural and organizational factors that influence the sustainability of cadre performance. Consequently, while this program was implemented in Gonggang Village, the intervention model demonstrated in this study holds strong potential for replication and scaling as a national strategy to reduce NCD prevalence through the reinforcement of community-based primary health services.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Hery Sumasto conceptualized and designed the community service program, supervised the overall implementation, and provided academic direction throughout the study. Astuti Setiyani coordinated field activities, facilitated cadre training and mentoring sessions, and contributed to data collection. Nurwening Tyas Wisnu was responsible for monitoring and evaluation processes, including pre-test and post-test assessment and observation of cadre performance. Mulyananda Dwi Mentari supported community engagement, assisted in training delivery, and contributed to data analysis and interpretation. Suhermin contributed to program planning, sustainability strategy formulation, and manuscript drafting and revision. All authors reviewed and approved the final manuscript and take responsibility for the accuracy and integrity of the work.

DECLARATIONS

ETHICAL APPROVAL

Information is not availabel.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

COMPETING INTERESTS

The authors declare no competing interests

VI. REFERENCES

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