

*THE 8TH INTERNATIONAL SYMPOSIUM OF PUBLIC HEALTH 2024***THE ROLE OF PENTAHHELIX IN THE IRON SUPPLEMENTATION PROGRAM AT ISLAMIC BOARDING SCHOOLS**

Mohamad Yoto^{1,2*}, Shrimarti Rukmini Devy³, Hari Basuki Notobroto³, Cicik Swi Antika², Malik Afif², Azizah Andzar Ridwanah², Nurul Jannatul Firdausi², Rizka Ufliasari²

¹*Doctoral Program, Faculty of Public Health, Airlangga University, Indonesia*

²*Health Office, East Java Province, Indonesia*

³*Department of Epidemiology, Biostatistics, Population Studies and Health Promotion, Faculty of Public Health, University of Airlangga, Indonesia*

**Mohamad Yoto: +6282132340627; mohamad.yoto-2023@fkm.unair.ac.id*

ABSTRACT

Introduction: Anaemia remains a public health issue in Indonesia, with a notably high prevalence, especially in Islamic boarding schools. Collaboration between the government, community, private sector, and media through the pentahelix approach is essential to address this problem. This study aims to illustrate the roles of each actor within the pentahelix framework in the iron supplementation programme at Islamic boarding schools in Kediri Regency, East Java. **Methods:** This study used qualitative methods, collecting data through Focus Group Discussions (FGDs) held in Kediri Regency in June 2024. FGD participants included 15 pentahelix actors, divided into government and non-government groups to ensure homogeneous discussion groups. The FGDs were recorded and transcribed verbatim, and the data were then analysed to identify research themes. **Results:** The research findings are outlined in three themes related to enhancing the role of the pentahelix in the iron supplementation programme at Islamic boarding schools in Kediri Regency: 1) The role of pentahelix actors, 2) Challenges of pentahelix, and 3) Opportunities for each pentahelix actor. **Conclusion:** The analysis shows that academics are the most dominant actors. However, this actor has limitations as it has yet to focus on the iron supplementation programme, highlighting the need for other actors specific and systematic involvement. Efforts to realise the iron supplementation programme will be optimal by applying collaborative governance with the pentahelix model.

Keywords: *Pentahelix, Islamic Boarding Schools, Anaemia, Iron Supplementation Programme*

INTRODUCTION

Anaemia remains a public health issue in Indonesia, with long-term impacts if not promptly addressed. World Health Organization, (2024) defines anaemia as a condition where haemoglobin levels in the blood fall below the normal threshold of less than 12 g/dL. World Bank Data (2019) recorded a global anaemia prevalence of 30% among women aged 15-49 years in 2019, a figure that closely mirrors Indonesia's rate of 31%.

This problem is corroborated by data from Basic Health Research (Riskesdas) in 2018, which reported an anaemia prevalence of 26.8% among children aged 2-14 years and 32% among those aged 15-24 years in Indonesia. Similarly, in East Java, the prevalence of anaemia among adolescent girls reached 5.8%, meaning 6 out of 100 girls suffer from anaemia. Kediri Regency is one of the areas in East Java with a notably high prevalence. Data from the Kediri District Health Office (2018) shows that the prevalence of anaemia among adolescent girls is 25%.

Anaemia is also a significant issue in Islamic boarding schools. Preliminary studies conducted by the East Java Provincial Health Office in 2022 in Kediri Regency at Miftahul Huda and Al Islam boarding schools found

anaemia prevalence rates of 40.81% and 45.95%, respectively. Compared to the standard, these prevalence rates are considered high as they exceed or equal to 40% (WHO, 2008).

Anaemia in Islamic boarding schools is caused by various factors such as unbalanced diets and sleep patterns and limited access to adequate healthcare services. Life in these Islamic boarding schools is typically governed by a strict schedule, including learning activities, religious practices, and daily routines (Suheri & Nurrahmawati, 2018). The demanding activities often lead to insufficient sleep and skipped meals, compounded by simple and less varied diets, which can cause nutrient deficiencies such as iron (Arifianti & Sudiarti, 2023; Handini et al., 2023). Furthermore, access to healthcare services still needs to be improved, evidenced by data showing that out of 313 registered Islamic boarding schools in Kediri Regency, only 30 have Pesantren Health Posts (Poskestren) (East Java Provincial Health Office, 2023a).

Unaddressed anaemia can have significant health impacts, particularly on adolescent girls, affecting intelligence, mental health, psychosocial development, and maturation processes (Suprayogi et al., 2023). Anaemia in adolescent girls also increases the risk of morbidity and mortality in mothers and children (WHO, 2008). The various impacts of anaemia prompted the Indonesian Ministry of Health to implement the iron supplementation programme aimed at schoolgirls aged 12-18 in junior and senior high schools. However, this programme has not been effectively implemented in Islamic boarding schools, mainly due to students' low level of compliance with consuming iron supplementation. Research by Rodhiyana et al., (2022) found that 96.1% of female students in Ar-Rohman Boarding School, Ngawi, did not comply with iron tablet consumption. This is further supported by the 2023 Indonesian Health Survey, which showed that 53.5% of adolescent girls in East Java had never received iron tablets.

The suboptimal effectiveness of the iron supplementation programme is more than just the government's responsibility; it requires cross-sector collaboration to maximise the programme and reduce the incidence of anaemia, especially in Islamic boarding schools. The government no longer dominates public policy implementation; other actors must participate in every policy (Sandi, 2022). This concept is known as collaborative governance, a new governance paradigm. Collaborative governance involves government agencies and direct engagement with other sectors outside the government (Arsandi, 2022; Surjadi et al., 2022). One approach to collaborative governance is the pentahelix collaboration (Kismartini et al., 2022; Purnomo et al., 2021).

Pentahelix collaboration extends the previous triple helix and quadruple helix models, which are used to understand the relationships between government and non-government actors in policy (Yunas, 2019). Windiani (2021) explains that pentahelix collaboration involves actors such as academics, business, community, government, and media. This collaboration aims to create synergy in addressing complex issues by involving each stakeholder's role. Therefore, this study aims to illustrate the potential roles of each actor in the pentahelix collaboration in the iron supplementation programme for adolescent girls in Islamic boarding schools in Kediri Regency, East Java.

METODE

This study employed qualitative methods, using purposive sampling and data collection through Focus Group Discussions (FGDs). The FGDs were conducted in Kediri Regency in June 2024. Participants included 14 pentahelix actors representing the Government, Academia, Business, Community, and Media sectors. The FGDs were divided into two groups: the government group and the non-government group. This grouping aimed to ensure homogeneity among participants, as more homogeneous groups facilitate more accessible communication and a focus on the discussion topic (Paramita & Kristiana, 2013).

Each FGD session lasted approximately 60-75 minutes. The discussions were recorded using a tape recorder and subsequently transcribed verbatim. The collected data were then analysed to identify themes relevant to the research objectives. This study received ethical approval from the Faculty of Dental Medicine Ethics Committee with approval number No.0422/HRECC.FODM/IV/2024.

RESULTS

Profil Participant

The key informants in this research involved 5 parts of the pentahelix in Kediri Regency, including the government, academics, business, community, and media.

Table 1. Profil Participant

Profil	Frequency	Percentage (%)
Type of Gender		
Male	7	50.00
Female	7	50.00
Part of the Pentahelix Actors		
Government	2	14.29
Academic	7	50.00
Business	1	7.14
Community	3	21.43
Media	1	7.14

As for each part represented by different agencies/institutions, namely, 2 (14.29%) government agencies, academics from 7 (50%) universities, 1 (7.14%) agency from Business Actors, 3 (21.43%) Community, and 1 (7.14%) Media.

The research results are translated into 3 themes related to increasing the role of pentahelix in the iron supplementation programme at Islamic boarding schools in Kediri Regency, namely: 1) the Role of Pentahelix Actors, 2) Pentahelix Challenges, 3) Opportunities for Each Pentahelix Actor.

Theme 1: Role of Pentahelix Actors

Pentahelix collaboration involves each actor, each of which has its role according to the actor's scope in overcoming a problem. The study results reveal that some actors still do not play enough roles in the iron supplementation programme in East Java Islamic boarding schools.

Islamic boarding schools often receive less attention and support from the Government. On the one hand, Islamic boarding schools are community-based Islamic educational institutions. Of course, the Government's role as a policymaker is needed to overcome existing problems. One Government agency also mentioned that health-related programmes focus only on public schools, while no one explicitly covers Islamic boarding schools

"The provision of socialisation or health-related programmes does not exist for Islamic boarding schools, nor does financing aimed at Islamic boarding schools." (P1, Government)

"So far, health activities cover primary schools, junior high schools, and PKBM (Community Learning Activity Centres) related to the healthy school programme, taking care of the UKS because not all schools have their own UKS by striving to have UKS in school institutions." (P2, Government)

In contrast to the government, academics have actively participated in several anaemia prevention programmes in Islamic boarding schools. The role of academics aligns with the Tri Dharma of Higher Education, which includes education and the obligation to conduct research and community service. The following results reveal the role of academics.

"Incidentally, we get a fostered area in the Kediri District Health Office area in the Mojo PHC (Primary Health Care) area where there are also several quite large Islamic boarding schools, one of which may be Ploso Islamic boarding school. It is just that, honestly, we have never been there. However, we also conducted research activities yesterday that have been carried out by several students this year, examining the effects of giving FE tablets but adding them to probiotic drinks." (P3, Academic)

"I also want to share a recent research project conducted by our students in the health promotion department, conducting research at an Al-Ithihad Islamic Boarding School in Malang Regency, it just so happens that the topic fits what we discussed today about preventing anaemia in Islamic boarding school, especially female student (santriwati)... So this student also carried out empowerment by forming a cadre of female students like this in an Islamic boarding school." (P5, Academic)

"Yesterday, we researched the material's family preparation of santri, which relates to anaemia and reproductive health. Yesterday, the research targeted Islamic boarding schools with a minimum of 1000 students in East Java. I held it at Lirboyo, and we collaborated with BKKBN." (P8, Academic)

"The focus on Islamic boarding schools itself is not so much, but InsyaAllah, on 17 July, we will have community service and KKN activities involving one of the villages with a Islamic boarding schools, namely in the Kediri City area, at the Al amin Islamic boarding school. There are several activities, one of which may be education and several activities, such as community service. Now, this educational activity may also be related to FE activities." (P9, Academic)

On the other hand, businesses' contributions to supporting the iron supplementation programme are still missing. The informant mentioned that the company already has a CSR (Corporate social responsibility) programme related to health, but it is still focused on the internal company. The informant also explained if his party could play a further role in building cooperation in the health sector, especially in Islamic boarding schools.

"In the company, it is not specific. CSR Health is only for internal, if there is a need, it is possible for the health sector.." (P10, Business)

Community in the pentahelix acts as catalysts. This makes a community composed of people with common interests actively contribute to a cause. The study results show that community organisations in Kediri Regency have focused on the health sector and reached out to Islamic boarding schools. Informants explained that they had approached the Islamic boarding schools. However, the programme focus of each community has yet to lead to an iron supplementation programme.

"In Aisyiyah, there are branches, sub-branches, and regions. So, from the region, it is conveyed to the branch and then to the sub-branch, and it works with the PHC (Primary Health Centre). A Pokjanal (Operational Working Group) is in the sub-district, and Aisyiyah is also involved there. Insha'Allah, it will be easier for us to succeed in adding iron supplementation and so on. Alhamdulillah, the stunting rate is also good. Insha Allah, our cadres from Aisyiyah also join the Posyandu (Integrated Service Post). About what was experienced in the Islamic boarding school, it was related to the problem of immunisation. Immunisation is difficult in Islamic boarding schools, some things are not allowed.. Finally, Aisyiyah came, introduced themselves, and explained our purpose. Finally, it was successful, Alhamdulillah the Islamic boarding school can carry out immunisation" (P11, Community)

"In Muslimat, starting from the district regency, sub-district, and branch, there is already a health sector, which today we focus on elderly health. So through Posbindu (Integrated Guidance Post), that is our cadre. There are Muslimat cadres who are also village cadres, so they are mixed, sometimes they are village cadres, sometimes they work at the PHC, and then they are Muslimat cadres too, so the synergy is extraordinary" (P12, Community)

Meanwhile, the media has a role in conveying information to the public, which can be in the form of processes, outputs or impacts of programs to expand awareness and accelerate motivation or enthusiasm for other parties towards a program. The informant conveyed that the media has taken a role in the health sector but not specifically on the issue of iron supplementation programmes in Islamic boarding schools.

"As a media, here is a journalist, it is like going into Promotive. Media related to health reporting already exists, so most of what is often reported is related to stunting cases, there are still minimal other publications. There was once an event in the city about a healthy mushola or mosque, so the Health Office and IIK Bhakti

Wiyata and Strada made an event to develop a healthy mushola or mosque, to motivate other mushollas that are less clean and holy” (P14, Media).

Theme 2: Challenges of the TTD Programme for Santriwati in Islamic Boarding Schools

The government's Policy support is needed to overcome anaemia in Islamic boarding schools. The study results show that agencies related to Islamic boarding schools, such as the Ministry of Religious Affairs and the Education Office, still do not have health development programs due to the allocation of funds and the absence of an organizational structure specifically aimed at addressing health problems, this was stated by the informant as follows.

“From the Ministry of Religious Affairs, there is no coaching programme, there are no funds/fees. We only rely on the district health office only” (P1, Government)

“There is nothing in the STOK (Organisational Structure and Work Procedure) that deals with health” (P2, Government)

Apart from the government side, obstacles are also found on the boarding school side. Low knowledge about health among female student (santriwati) and Islamic boarding school managers is one of the obstacles in the iron supplementation program. In addition, the provision of interventions is often constrained in terms of acceptance by female student, so an approach is needed first through the management of the Islamic boarding school to be able to accept, which ultimately makes female student want to be involved in the intervention carried out. The good acceptance from the Islamic boarding school regarding the iron supplementation programme indicates that the Islamic boarding school cares about the health of its female student. Furthermore, some informants explained that health problems are still a challenge in the Islamic boarding school, such as various diseases that often occur in female student, which ultimately have an impact on health, as well as Poskestren (Pesantren Health Posts), which is still lacking in facility management. Several informants expressed this, as follows.

“So the friends have reached the Islamic boarding schools to apply for permission, but the Islamic boarding school turned out to be difficult to enter, the point is that it depends on the Islamic boarding schools how we approach the Kyai (cleric), it is not that easy, there are very inflexible huts” (P4, Academic).

“Adding suggestions related to identifying the causes of anaemia is necessary because Islamic boarding schools lack hygiene, so there are many cases of helminthiasis. Students also researched the cause of anaemia, not only due to lack of FE but also due to helminthiasis. Then gastritis is found in many female students, so it could also be due to gastritis, so there may be many causes of anaemia. Even if FE is given, it will not be effective if there are still helminthiasis and gastritis” (P8, Academic).

“Yesterday's experience related to PHBS activities in the city area invited representatives of Islamic boarding schools to attend. However, those who came were mostly the only available representatives, so the results of the activity did not reach the Islamic boarding school directly. The most important experience we found was related to how the owner of the Islamic boarding school was open. He supported it because the teachings are stronger in the boarding school than in the Kyai or Gus, so the approach was carried out first” (P9, Academic).

“At my children's boarding school in Sudimoro, there is a doctor, but there are no regular hours for picketing. That has become an obstacle in itself; you want to be told to go to the clinic, but the doctor is unavailable. The doctor may be busy, but other health workers, maybe nurses or something, are also not on standby, so finally, it is as simple as possible for first aid.” (P12, Community).

“In the context of pesantren, I see quite a lot of caregivers, caregivers in pesantren who have been 24 hours with the female students, but then their knowledge on health is still limited” (P13, Community).

Theme 3: Opportunities for Each Pentahelix Actor

Each pentahelix actor has an opportunity to help develop an iron supplementation programme in Islamic boarding schools. The government can play a role as a regulator and a controller. The results of the discussion explain that there are opportunities that can be done by the Regional Office of the Ministry of Religious Affairs and the Education Office as follows.

“It is still very possible to have a forum for extension workers in assisting iron supplementation programme” (P1, Government)

“It is possible to have a forum, directly to MKKS (Principal's Working Forum). Meet each school principal to discuss iron supplementation programme” (P2, Government)

Academics have a role in research and community service. They are also the concepts that, in this case, not only run the programme but also expand its scope, as expressed by the following informant from academia.

“I think even if it is implemented later, maybe we can continue the programme, with this, it might also be one of the discourses that we can think about in the future” (P3, Academic)

In terms of business actors, opportunities lie in the utilisation of CSR (Corporate Social Responsibility). CSR is the concept that companies are responsible for their business activities' social and environmental impacts. The existence of CSR carried out by companies aims to make a real contribution to improving the quality of life of the community and the environment. One of these CSR activities can support health programmes. The informant said that the company is open to collaborating on health programmes.

“Applicants for CSR can submit a proposal” (P10, Bussiness)

Communities also have an important role in collaboration with local health facilities by mobilising their cadres. Using existing technology in the community can be adapted and become an opportunity to support programmes whose targets are in management. This is as expressed by the following informant.

“Our cadres in Aisyah also join those in Posyandu (Integrated Service Post)” (P11, Community)

“Muslimat cadres are also amazingly synergistic, so the tensimeter and so on can be brought to help the success of the programme, Inshaallah we are sure optimistic that by working together, everything can be done” (P12, Community)

“Reminder by the system for caregivers and this aspect must be systemic. We have technological capabilities that can help prepare periodic messages to help caregivers of Islamic boarding school rooms, namely reminders by system” (P13, Community)

Meanwhile, the media can promote health through online and offline media to be publicised. This emphasises that the media strategically raises public awareness of health issues and encourages public participation.

“There is a need for massive publication now there is much use of mobile phones, so there is a need for media on social media as well, it could be that if there is innovation, we can create a healthy Islamic boarding school event, it can increase the enthusiasm of other Islamic boarding school or other health events that can be publicised in the mass media” (P14, Media)

The opportunities of each pentahelix role are mapped in the following table.

Table 2. Opportunities of each pentahelix actor

Actor	Opportunities
Government	- Supervision of health programme implementation
Academic	- Conduct research related to anaemia - Community service to develop health programmes in Islamic boarding schools
Business	- Funding or logistical assistance related to nutritional food for female students (santriwati) in Islamic boarding schools
Community	- Strengthening Islamic boarding schools in terms of health through available cadres - Use of technology in the form of reminders from NGOs for Islamic boarding school to support health programmes
Media	- Publication of activities in each health programme at the Islamic boarding school

DISCUSSION

The Role and Opportunities of Pentahelix in the Iron Supplementation Programme in Islamic Boarding Schools

Government

The findings explain that government parties such as the Ministry of Religious Affairs and the Education Office have not provided support for the iron supplementation programme in Islamic boarding schools, although there is a UKS (School's Health Clinic) programme as part of the iron supplementation programme process held by the Education Office, but in the hierarchy, the programme only covers SD, SMP, and PKBM and does not fully cover Islamic boarding schools which are both educational institutions. If quoted from Siswantara et al. (2019) show that female students (santriwati) really needs health services such as UKS, which in Islamic boarding schools is called Poskestren (Pesantren Health Post).

Meanwhile, the Ministry of Religious Affairs, as the institution that oversees the management of Islamic boarding schools, does not have a budget and programme that focuses on health in the Islamic boarding school environment. The domain of the Ministry of Religious Affairs of Kediri Regency to date is only related to licensing in the establishment of Islamic boarding schools and policies in the field of education. The Ministry of Religion needs to take on a role related to health policies in Islamic boarding schools. In an ideal pentahelix synergy, the government should provide policies, funding, and regulations supporting health programmes. Frieden (2014) explains that the synergy between public and private sector organisations is the key to the success of a public health programme.

The results of the information gathering found that the Education Office and the Ministry of Religious Affairs of Kediri Regency have opportunities in the pentahelix related to the iron supplementation programme in Islamic boarding schools. The Education Office has a Communication Forum for Junior High School Principals, which can be used to make commitments between school principals related to managing the iron supplementation programme in Islamic boarding schools with Madrasah Tsanawiyah.

The Ministry of Religious Affairs has religious instructors. These religious instructors are tasked with providing education, information, and consultation related to government programmes voiced in the language of religion. These religious instructors can support and encourage Islamic boarding schools to participate in the iron supplementation programme. Quoted from the Technical Guidelines for Guiding the Implementation of Healthy Schools/Madrassas (2021) explains that there needs to be a collaboration between the Education Office and the Regional Office of the Ministry of Religious Affairs in fostering the implementation of healthy schools/madrassas so in this case, the role of both agencies is needed in the iron supplementation programme.

Academic

The findings from the research show that the role of pentahelix actors is still dominant in academic actor. Academics play an active role in conducting research and community service related to health programs related to anaemia in Islamic boarding schools. This is different from other actors, such as government, community, business, and media, who still have not shown their concrete roles.

The findings show that many universities have conducted research in Islamic boarding schools related to the provision of iron supplementation. The research conducted makes academics in the pentahelix act as conceptors in solving problems faced by the community, so that academics can be a source of new concepts and knowledge that are in accordance with existing conditions (Yunas, 2019). The role of academics also has the potential to be involved in advocacy efforts by providing health policy studies (Mulyanto et al., 2021).

Academics, which include universities, also carry out community service. The community service efforts carried out are one of the pillars of the Tri Dharma of Universities. The existence of community service is a form of applying knowledge that has been developed from the results of education, so that the community service that has been carried out can be utilised and enjoyed by the community (Lian, 2019).

Community

Community in pentahelix is not just a community group, but involves communities that move according to the same goal. The results of discussions involving socio-religious community organisations and NGOs (Non-Governmental Organisations) show that so far, there has been a role in the health sector, but there are no programs that focus on Islamic boarding schools.

The existence of health programmes in the community makes it an opportunity for pentahelix collaboration. The findings show that community organisations have cadres in each area. These cadres can be utilised to assist in the iron supplementation programme. The cadres can serve as supervisors and counsellors to provide motivation to drink iron supplementation. In addition, some NGOs can collaborate by assisting with technology-based reminder systems. Room caregivers can use the reminder system technology to remind the students to drink iron supplementation.

This opportunity can help female student in the iron supplementation programme, because a person's compliance does not only come from the knowledge they have, without support in terms of motivation and reminders to drink iron supplementation, it can cause the compliance to decrease. Low compliance can also occur because the person forgets to take medicine, which is unintentional compliance so even someone with good knowledge can encounter non-compliance (Firdausia et al., 2022) in line with the study of Angadi & Davalgi (2019) which states that one of the factors for non-adherence in taking iron supplementation is forgetting.

There is an opportunity for the role of the community in pentahelix to become a driver in the field. This is in line with a study conducted by Haldane et al. (2019), which suggests that the participation of local communities can increase the effectiveness of health interventions. The community can act as a driver of the programme by involving associations or communities with goals in line with the programme to maintain its sustainability (Aditya, 2019).

Business actors

Business actors or the private sector commit to the form of Corporate Social Responsibility (CSR). This commitment is in the form of a program to contribute to the community, focusing on the environment, education, and health. The discussion findings showed that one of the companies in Kediri Regency did not have a CSR that focused on health, especially in Islamic boarding schools. This shows that CSR has yet to direct its attention to Islamic boarding schools as a target in the program so that it can be used as an opportunity by involving the private sector to collaborate in the pentahelix.

The private sector can participate by providing financial assistance or nutritious food products that support anaemia programs in Islamic boarding schools. If this can happen, of course, the nutritional problems that are often obstacles in Islamic boarding schools can be resolved, as explained by Andayani et al., (2022), that the

private sector can play a role as an enabler through CSR in the form of funding, products or services that are tailored to the business scope of each sector.

Media

The media can act as an amplifier in publicising a program, from the planning stage and implementation to the program's impact. The findings show that the media has contributed to publicising one of the clean Mushollah mosque event activities carried out by the Kediri Regency Health Office and one of the universities. The role of publication owned by the media can be an opportunity as a means of information related to the iron supplementation programme at the Islamic Boarding School. The role of the media as mass communication helps the implementation of community health programs to be effective. In this case, mass communication is in the form of news media, advertising, social media, and digital media (Frieden, 2014).

The dissemination of information through the media can be a form of promotion and prevention of a health program. Disseminating this information helps build awareness among other Islamic boarding schools so they can participate in a health program. Information through mass media in various forms can increase public awareness, knowledge, attitudes, and behaviour related to health topics. This is in line with the study of Wakefield et al. (2010), which shows that mass media influences by impacting positive changes or preventing negative changes in health behaviour in large populations.

Challenges of the Iron Supplementation Programme Problems in Islamic Boarding Schools

The role that is carried out cannot immediately run well, of course there are challenges that are faced. One challenge is the lack of government support. Without policy support and funding from the government, health programs are often unsustainable, and it isn't easy to achieve the desired results. Carino et al. (2023) explained that mandatory public policies, clear targets, and funding are the most effective policies in helping to implement a program. Freedman et al., (2013) added that the sustainability of health programs is highly dependent on adequate resources.

In addition, the lack of support from the Islamic boarding school side is also a challenge. There are often cultural barriers and a lack of understanding of the importance of health programs. Mahmoodi et al., (2023) explained that a lack of understanding of the goals, benefits and responsibilities is an obstacle to implementing health programs. Cultural factors from Islamic boarding schools are also part of it.

Islamic boarding school culture is a habit that is taught and passed down from generation to generation, and this culture will not easily disappear (Rohdiana, 2023). Relational relationships in Islamic boarding schools can be established synergistically through the spectrum of Kyai (cleric), Gus (young cleric), Ustadz, Badal (assistant), and Murabbi (mentor). The existence of a relational relationship causes students to have a submissive attitude and not want to argue with what the Kyai does. The relationship between students and Kyai is a patron client, where the kyai is a place for students to depend on based on a belief system (Oepen & Karcher, 1987). This can be a problem if the kyai rejects a health program, so an approach is needed to the kyai or internal parties of the Islamic boarding school before the program is implemented.

Another obstacle is the limited facilities or availability of health service infrastructure, which are generally considered inhibiting factors in the effectiveness of the iron supplementation programme in Islamic boarding schools. Female students often suffer from gastritis and helminthiasis, so even though they receive iron supplementation, they still suffer from anaemia. The illnesses suffered by female students also often cannot get first aid, this is because the Islamic boarding school does not yet have a Poskestren, so female students must first check themselves outside if they are sick. The existence of a Poskestren in the Islamic boarding school environment will be a means of promotive and preventive services without ignoring the curative and rehabilitative aspects. In addition, the Poskestren is also an extension of the PHC specifically for Islamic boarding school residents and aims to maintain the health of Islamic boarding school residents directly (Abidin, 2023).

CONCLUSION

This discussion concludes that the success of the iron supplementation programme for young women in Islamic boarding schools is highly dependent on the synergy between various pentahelix actors, namely the government, academics, communities, business actors, and the media. Although academics have shown a dominant role in research and community service, government support still needs improvement. In addition, the community has potential through the role of cadres as supervisors and counsellors, as well as NGO collaboration for technology support. The private sector, through CSR, can contribute funding or products to support health in Islamic boarding schools. The media plays a role in publicising programs, from planning to impact to increasing awareness and participation of Islamic boarding schools in health programs. Several challenges still need to be overcome, including a lack of policy support from the government, cultural barriers and understanding in Islamic boarding schools, and limited health facilities. In overcoming these challenges, a synergistic approach is needed from all pentahelix actors to ensure the sustainability and effectiveness of the iron supplementation programme in Islamic boarding schools, so that it can reduce the prevalence of anaemia among adolescent girls.

REFERENCES

- Abidin, Z. (2023). Management of Pesantren-Based Health Services through Santri Husada. *Urwatul Wutsqo: Jurnal Studi Kependidikan Dan Keislaman*, 12(2), 460–472. <https://jurnal.stituwjombang.ac.id/index.php/UrwatulWutsqo/article/view/1311>
- Aditya, R. (2019). Pentahelix Analysis in Evaluating the Sustainability of the Patratura CSR Program in 2017. *Empower: Jurnal Pengembangan Masyarakat Islam*, 4(2), Article 2. <https://doi.org/10.24235/empower.v4i2.5320>
- Andayani, Q., Ariadi, S., Koesbardiati, T., Fauziah, N., & Praharsena, B. (2022). Penta-helix "Desa Emas" As A Commitment to Accelerate Stunting Reduction in Sumenep Regency, East Java Province. *Media Gizi Indonesia*, 17(1SP), Article 1SP. <https://doi.org/10.20473/mgi.v17i1SP.64-75>
- Angadi, N., & Davalgi, S. (2019). Compliance to weekly iron and folic acid supplementation among adolescent school girls: A study from rural Karnataka. *National Journal of Research in Community Medicine*, 8(3), 222. <https://doi.org/10.26727/NJRCM.2019.8.3.222-225>
- Arifianti, D. I., & Sudiarti, T. (2023). Determinants of Anemia in Adolescent Girls in Islamic Boarding Schools in Indonesia: Literature Review. *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*, 15(1), 1–12. <https://doi.org/10.34011/juriskesbdg.v15i1.2119>
- Arsandi, S. (2022). Collaborative Governance in the Optimisation of Tax Revenue: Case Study in Yogyakarta. *Jurnal Bina Praja*, 14(1), 17–29. <https://doi.org/10.21787/jbp.14.2022.17-29>
- Carino, S., Collins, J., Malekpour, S., & Porter, J. (2023). The Role of Policy in Supporting Environmentally Sustainable Foodservice in Healthcare: Lessons from Exemplar Hospitals. *Frontiers in Nutrition*, 10, 1122911. <https://doi.org/10.3389/fnut.2023.1122911>
- East Java Provincial Health Office. (2023a). *Data on Islamic Boarding Schools, Santri Husada, and the Development Level of Poskestren in East Java Province in 2023*.
- East Java Provincial Health Office. (2023b). *Lessons Learned from Optimising Iron Tablet Supplementation for Adolescent Girls in Islamic Boarding Schools*. Bidang Kesehatan Masyarakat Dinas Kesehatan Provinsi Jawa Timur.
- Firdausia, S., Hadiwiardjo, Y. H., & Wahyuningsih, S. (2022). *Relationship Between Knowledge, Attitude, Family Support, and Adherence to Taking Medication in Patients with Hypertension*. The 9th International Conference on Public Health, Solo, Indonesia. <https://doi.org/10.26911/FP.ICPH.09.2022.17>
- Freedman, A. M., Kuester, S., & Jernigan, J. (2013). Evaluating Public Health Resources: What Happens When Funding Disappears? *Preventing Chronic Disease*, 10. <https://doi.org/10.5888/pcd10.130130>

Frieden, T. R. (2014). Six Components Necessary for Effective Public Health Program Implementation. *American Journal of Public Health*, 104(1), 17–22. <https://doi.org/10.2105/AJPH.2013.301608>

Haldane, V., Chuah, F. L. H., Srivastava, A., Singh, S. R., Koh, G. C. H., Seng, C. K., & Legido-Quigley, H. (2019). Community Participation in Health Services Development, Implementation, and Evaluation: A Systematic Review of Empowerment, Health, Community, and Process Outcomes. *PLoS ONE*, 14(5), e0216112. <https://doi.org/10.1371/journal.pone.0216112>

Handini, K. N., Ilmi, I. M. B., Simanungkalit, S. F., & Octaria, Y. C. (2023). The Correlation between Knowledge, Sleep Patterns, Dietary Pattern, Inhibitors, and Enhancers with Anemia Incidence in Adolescent Girls at Al-Amanah Al-Gontory Islamic Boarding School South Tangerang City. *Amerta Nutrition*, 7(2SP), 147–154. <https://doi.org/10.20473/amnt.v7i2SP.2023.147-154>

Kismartini, K., Widowati, N., Syaharani, S. P., & Pramudita, A. G. (2022). Pentahelix Collaboration in Eradicating Corruption to Achieve Good Governance in Indonesia. *Jurnal Ilmu Administrasi Negara ASIAN (Asosiasi Ilmuwan Administrasi Negara)*, 10(2), Article 2. <https://doi.org/10.47828/jianaasian.v10i2.116>

Lian, B. (2019). The Responsibility of The University's Tridharma is to Respond to The Needs of Society. *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang*. <https://jurnal.univpgri-palembang.ac.id/index.php/Prosidingpps/article/view/2965>

Mahmoodi, H., Bolbanabad, A. M., Shaghaghi, A., Zokaie, M., Gheshlagh, R. G., & Afkhamzadeh, A. (2023). Barriers to Implementing Health Programs Based on Community Participation: The Q Method Derived Perspectives of Healthcare Professional. *BMC Public Health*, 23, 2019. <https://doi.org/10.1186/s12889-023-16961-5>

Ministry of Health of the Republic of Indonesia. (2018). *The 2018 Indonesian Basic Health Survey*.

Ministry of Health Republic Indonesia. (2021). *Technical Guidance on The Implementation of Healthy School/Madrasah's*. Ministry of Health Republic Indonesia.

Ministry of Health Republic Indonesia. (2024). *The 2023 Indonesian Basic Health Survey*.

Mulyanto, E., Larasati, E., Kismartini, K., Putranti, I., & Suryawati, C. (2021). Collaborative Governance: The Opportunity in Policy Advocacy of Continuum of Care to Improving Indonesian Women's and Children's Health. *Proceedings of the 5th International Conference on Indonesian Social and Political Enquiries, ICISPE 2020, 9-10 October 2020, Semarang, Indonesia*. Proceedings of the 5th International Conference on Indonesian Social and Political Enquiries, ICISPE 2020, 9-10 October 2020, Semarang, Indonesia, Semarang, Indonesia. <https://doi.org/10.4108/eai.9-10-2020.2304768>

Oepen, M., & Karcher, W. (1987). *Dinamika Pesantren*. P3M.

Paramita, A., & Kristiana, L. (2013). Focus Group Discussion Tehnique in Qualitative Research. *Buletin Penelitian Sistem Kesehatan*, 16(2), 117–127.

Purnomo, E. P., Aditya, F., Teguh Fathani, A., Salsabila, L., & Rachmawatie, D. (2021). Penta-Helix Approach as a Strategy to Recovery Tourism in Bali Due to Covid-19 Pandemic. *Proceedings of the 11th International Conference on Information Communication and Management*, 122–127. <https://doi.org/10.1145/3484399.3484417>

Rodhiyana, R., Amalia, R. B., & Adityawarman, A. (2022). The Effect of Supporting on Adherence to Fe Tablet Consumption in Adolescent Women. *Indonesian Midwifery and Health Sciences Journal*, 6(3), Article 3. <https://doi.org/10.20473/imhsj.v6i3.2022.319-328>

Rohdiana, F. (2023). Pesantren Culture and Santri Character Education at Darussalamah Islamic Boarding School. *Al-I'tibar: Jurnal Pendidikan Islam*, 10(1), 15–24. <http://journal.unuha.ac.id/index.php/JPIA/article/view/1843>

Sandi, J. R. A. (2022). Building Government-Private-Civil Society Relations within the Governance Paradigm for a More Blessed and Dignified Central Kalimantan. *Journal Ilmu Sosial, Politik Dan Pemerintahan*, 11(1), Article 1. <https://doi.org/10.37304/jispar.v11i1.4201>

- Siswantara, P., Soedirham, O., & Muthmainnah, M. (2019). Youth as the Main Drivers in the Implementation of Adolescent Health Programs. *Jurnal Manajemen Kesehatan Indonesia*, 7(1), 55–66. <https://doi.org/10.14710/jmki.7.1.2019.55-66>
- Suheri, S., & Nurrahmawati, Y. T. (2018). Multicultural Education Model in Islamic Boarding Schools. *Pedagogik: Jurnal Pendidikan*, 5(1), 32–49. <http://ejournal.unuja.ac.id/index.php/pedagogik/article/view/217>
- Suprayogi, D., Khamidah, A., Aprilia, F., Khasanah, K. D., & Pribadi, E. T. (2023). Literature Review: Association of Iron Deficiency Anemia with Cognitive Function in Adolescents. *Proceedings of International Conference on Halal Food and Health Nutrition*, 1(1), Article 1. <https://doi.org/10.29080/ichafohn.v1i1.1143>
- Surjadi, S., Herwati, A. R., & Warsono, H. (2022). Collaborative Governance on Slum Upgrading in Cultural Heritage Area: A Case Study of Pulau Penyengat, Indonesia. *Journal of Madani Society*, 1(3), Article 3. <https://doi.org/10.56225/jmsc.v1i3.138>
- Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of Mass Media Campaigns to Change Health Behaviour. *Lancet*, 376(9748), 1261–1271. [https://doi.org/10.1016/S0140-6736\(10\)60809-4](https://doi.org/10.1016/S0140-6736(10)60809-4)
- WHO. (2008). *Cut-off Values for Public Health Significance*. <https://www.who.int/data/nutrition/nlis/info/anaemia>
- WHO. (2024). *Guideline on Haemoglobin Cutoffs to Define Anaemia in Individuals and Populations*. World Health Organization. <https://iris.who.int/bitstream/handle/10665/376196/9789240088542-eng.pdf?sequence=1>
- Windiani, W. (2021). Pentahelix Collaboration Approach in Disaster Management: Case Study on Disaster Risk Reduction Forum-East Java. *IPTEK Journal of Proceedings Series*, 7, 71–77. <https://iptek.its.ac.id/index.php/jps/article/view/9540>
- World Bank Data. (2019). *Prevalence of Anemia among Women of Reproductive Age (% of Women Ages 15-49)*. World Bank Open Data. <https://data.worldbank.org/indicator/SH.ANM.ALLW.ZS>
- Yunas, N. S. (2019). Implementation of the Penta Helix Concept in Village Potential Development through the Village Economic Barn Model in East Java Province. *Mantra Pembaruan: Jurnal Inovasi Kebijakan*, 3(1), 37–46. <https://doi.org/10.21787/mp.3.1.2019.37-46>