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# Optimizing Health Services Through Telepharmacy Implementation to Improve Health Access and Education in the Pekalongan Regency Community

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**Artikel info**

Abstract.
*Keterbatasan akses masyarakat pedesaan terhadap informasi obat yang akurat dan rendahnya literasi kesehatan digital menjadi permasalahan utama dalam pelayanan kesehatan di Kabupaten Pekalongan. Program pengabdian masyarakat ini bertujuan meningkatkan akses layanan farmasi dan edukasi kesehatan melalui implementasi telefarmasi berbasis teknologi. Metode pelaksanaan dilakukan melalui edukasi masyarakat, pelatihan tenaga farmasi dan kader kesehatan, serta implementasi platform telefarmasi di wilayah Paninggaran, Petungkriyono, dan Linggoasri. Sasaran kegiatan meliputi masyarakat (n=30), tenaga farmasi (n=10), dan kader kesehatan (n=5). Hasil kegiatan menunjukkan peningkatan pengetahuan dan keterampilan pada seluruh kelompok sasaran. Nilai rata-rata masyarakat meningkat dari 48% menjadi 87%, tenaga farmasi dari 53% menjadi 91%, dan kader kesehatan dari 47,6% menjadi 86,6%. Program ini juga meningkatkan kemampuan tenaga kesehatan dalam memanfaatkan teknologi digital serta mendorong pemberdayaan ekonomi masyarakat melalui pelatihan kewirausahaan berbasis kesehatan. Secara keseluruhan, implementasi telefarmasi berhasil meningkatkan akses layanan kesehatan, memperkuat literasi kesehatan digital masyarakat, serta menjadi model pemberdayaan berbasis teknologi yang berpotensi direplikasi di wilayah lain.*

Abstract.
*Limited access to accurate drug information among rural communities and low digital health literacy are major challenges in healthcare services in Pekalongan Regency. This community service program aims to improve access to pharmaceutical services and health education through the implementation of technology-based telepharmacy. Implementation methods include community education,*

*training of pharmacists and health cadres, and implementation of a telepharmacy platform in the Paninggaran, Petungkriyono, and Linggoasri areas. The target groups included the community (n=30), pharmacists (n=10), and health cadres (n=5). Results showed an increase in knowledge and skills across all target groups. The average score for the community increased from 48% to 87%, for pharmacists from 53% to 91%, and for health cadres from 47.6% to 86.6%. The program also improved the ability of health workers to utilize digital technology and encouraged community economic empowerment through health-based entrepreneurship training. Overall, the implementation of telepharmacy has successfully increased access to healthcare services, strengthened digital health literacy in the community, and become a technology-based empowerment model with the potential to be replicated in other regions.*

**Keywords:**
*Edukasi Kesehatan; Layanan Farmasi ; Pemberdayaan Masyarakat ; Telefarmasi.*

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## INTRODUCTION

The development of digital technology has brought about significant changes in various sectors, including the health sector. Digital transformation in the health sector is a strategic solution to improve the quality of healthcare services, particularly in areas with limited access to healthcare professionals and pharmaceutical facilities (Abdur Rahman, Adji Prayitno Setiadi, 2025). One emerging innovation is telepharmacy, a remote pharmaceutical service that utilizes information and communication technology to provide online drug consultations, health education, therapy monitoring, and prescription services. The use of telepharmacy is considered capable of bridging the gap in healthcare access between urban and rural communities, particularly in remote areas with limited healthcare resources (Florensa Reni Kopa Rihi, I Gusti Ayu Rai Widowati, 2024).

Pekalongan Regency, particularly the Paninggaran, Petungkriyono, and Linggoasri areas, continues to face various challenges in healthcare services. Public access to accurate drug information remains limited due to a shortage of pharmacists, low health literacy, and limited healthcare facilities. This situation often leads people to self-medicate without proper consultation, which risks irrational drug use, side effects, and even therapeutic failure. Furthermore, the development of digital health technology has not been optimally utilized by the community or local healthcare professionals (World Health Organization 2020-2027, 2020).

Several previous studies have shown that the implementation of digital-based healthcare services can improve the quality of public healthcare services. Research by Mayang Puspita Amara (2024) stated that integrating digital technology into community pharmacy services can improve the effectiveness of communication between patients and healthcare professionals. Another study by Sengaji (2023) showed that telepharmacy services in regional community health centers (Puskesmas) can improve public access to medication consultations and health education more quickly and efficiently. Furthermore, research by Sari (2020) explained that the implementation of telepharmacy in remote

areas has a positive impact on increasing public knowledge regarding rational medication use (Mayang Puspita Amara, Harsono Teguh, 2024) (Sari et al., 2020) (Sengaji et al., 2023) .

The urgency of this community service program is based on the community's low digital health literacy and the limited ability of pharmacists to utilize technology for healthcare services. Based on an initial survey conducted in partner communities, 65% of the community experienced difficulty obtaining accurate drug information, while 80% of local pharmacists admitted to not optimally utilizing digital technology for pharmaceutical services (Shapovalova, 2025). This situation highlights the need for technology-based interventions that can increase the capacity of healthcare workers while empowering the community to utilize digital health services (Abdur Rahman, Adji Prayitno Setiadi, 2025).

As a solution to these problems, this community service program implements telepharmacy services through community education, training of pharmacists and health cadres, and mentoring on the use of the telepharmacy platform. This program not only aims to improve access to and quality of healthcare but also encourages community economic empowerment through the development of digital-based healthcare businesses. Furthermore, this activity integrates Islamic and Muhammadiyah values, such as the spirit of mutual assistance, professionalism, trustworthiness, and community benefit. Through the implementation of this program, it is hoped that there will be an increase in digital health literacy in the community, an increase in the competence of health workers in technology-based services, and the creation of a telepharmacy-based community empowerment model that can be replicated in other regions with similar characteristics.

## Data and Methodology

1. Implementation Stages for Productive Economic Partners
   a. Production
      1) Identify raw material needs for simple drugstore businesses.
      2) Facilitate collaboration with generic drug distributors to maintain supply stability.
      3) Provide training on drug stock management and digital recording systems.
   b. Management and Marketing
      1) Conduct micro-business management training, including simple financial management.
      2) Provide training on the use of social media and digital platforms to promote health products.
      3) Develop an online drug ordering system integrated with a telepharmacy platform.
2. Implementation Stages for Non-Productive Partners
   a. Health Services
      1) Build or improve pharmacy consultation rooms at local community health centers.
      2) Provide educational materials such as posters, brochures, and health videos.
   b. Education and Training
      1) Train local health cadres to provide direct education to the community.
      2) Conduct workshops on the importance of proper medication use and the use of telepharmacy services.
3. Partner Participation
   Partners will be actively involved in every stage of implementation, from identifying needs to evaluating program outcomes. Communities will be empowered to independently manage the facilities and services provided.

4. Program Evaluation and Sustainability

Evaluations are conducted periodically through surveys and interviews to measure the program's impact.

5. Roles and Duties of Team Members
   Lecturers: Responsible for program design, training, and technical assistance. Students: Assist with program implementation in the field, including community education and data management.
6. Credit Recognition for Students
   Involved students can receive credit recognition in accordance with campus policies, specifically through the Independent Learning Campus (MBKM) program.
7. Partner Participation in Program Implementation
   Partners will be actively involved in every stage of program implementation. This includes:
   a. Needs Identification
      Partners will be involved in the initial survey and needs analysis to ensure the solutions offered align with their challenges.
   b. Activity Implementation
      Partners will participate in training, mentoring, and program implementation, both as participants and as facilitators assisting with activity organization.
   c. Monitoring and Evaluation
      Partners will be involved in monitoring and evaluation to measure achievements and provide input for program improvement (Andriana, 2023).
8. Evaluation of Program Implementation and Sustainability
   Evaluation of program implementation will be conducted through several stages:
   a. Periodic Monitoring
      During implementation, periodic monitoring will be conducted to assess program progress and ensure that the implemented solutions are running according to plan.
   b. Final Evaluation
      Upon completion of the program, a final evaluation will be conducted to assess the overall program achievements, impact, and sustainability. The results of this evaluation will serve as the basis for future program development.
   c. Program Sustainability
      To ensure sustainability, the program will establish a working group or committee consisting of members of the partner and the proposing team. This group will be responsible for continuing the program after the initial phase ends, including seeking additional resources and integrating the program into the partner's routine activities (Bahar et al., 2025).

Tabel 1. Roles and Duties of Team Members

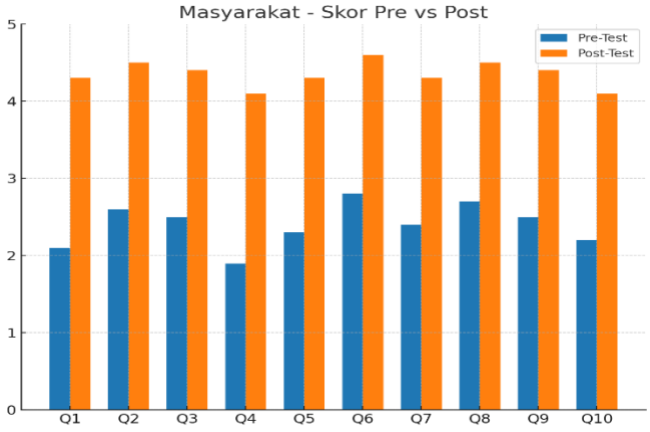
| No. | Position | Role | Duties |
|---|---|---|---|
| 1 | Lead researcher (Pharmacy lecturer) | Responsible for planning and supervising all program activities, providing academic guidance, and coordinating field activities with partners. | Developing training materials, holding coordination meetings with partners, leading evaluations, and writing the final program report. |
| 2 | Researcher (Pharmacy lecturer) | Providing technical guidance related to early detection, health education, and improving health facilities at the Community Health Center (Puskesmas). | Developing health training modules, training health workers, and monitoring the implementation of health services. |
| 3 | Researcher (Pharmacy lecturer) | Leading training activities in economics, business | Developing economic training modules, providing business consulting, and assisting |

| | | | |
|---|---|---|---|
| | | management, and marketing for program participants. | participants in business development. |
| 4 | Researcher (Nursing lecturer) | Providing technical guidance related to early detection, health education, and improving health facilities at the Community Health Center (Puskesmas). | Developing health training modules, training health workers, and monitoring the implementation of health services. |
| 5 | Research members (Pharmacy students) | Involved in the implementation of the program as training facilitators, participant companions, and data collectors for monitoring and evaluation. | Assisting in implementing training, organizing field activities, and documenting the process and results of the program. |

9. Potential Credit Recognition for Students
   Students participating in this program will receive potential credit recognition through:
   a. Field Experience
      This activity can be recognized as part of the Independent Learning Campus (MBKM) program, where students gain practical experience equivalent to 20 credits.
   b. Community Service Project
      Students can submit the results of their involvement as a community service project recognized by the university.
   c. Skills Development
      Students will also gain additional skills that can be used in their future careers, particularly in the fields of public health and economics.

## Results and Discussion

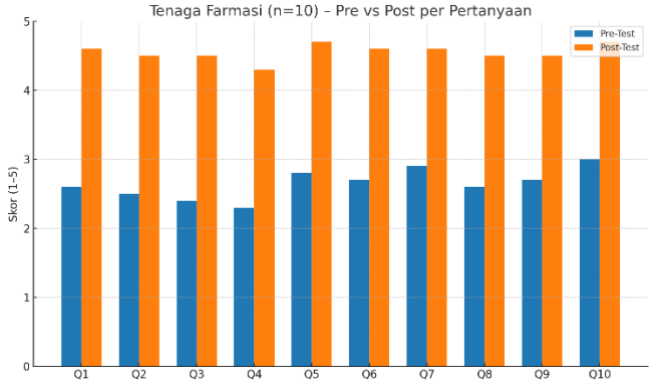
1. **Improving Access to Healthcare Services through Telepharmacy**
   a. Community (n=30)
      Average increase of 48% → 87% (+39 points). This increase indicates a significant increase in digital health literacy—participants increasingly understand the concept of telepharmacy, how to access the application, and the importance of consulting a pharmacist before taking medication. This finding aligns with the program's goal of expanding access to drug information and community-based health education.




***Grafic 1.*** Results of Pre-Test & Post-Test of Community Groups

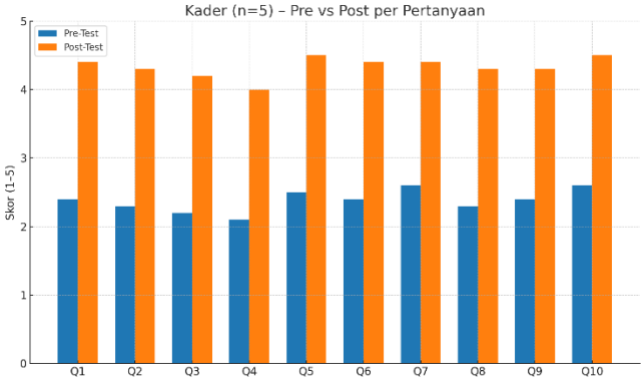
   b. Pharmacy Staff (n=10)
      Average increase of 53.0% → 91.0% (+38.0 points), with an N-Gain of ≈ 80.9% (high category). The largest increases generally occurred in skills in operating digital

consultation/prescription applications, online patient support, and understanding data security/confidentiality. This achievement is consistent with the target of training 10 pharmacy staff to be competent in using the telepharmacy platform.




***Grafic 2.*** Pre-Test & Post-Test Results for the Pharmaceutical Workforce Group

c. Cadres (n=5)
Average increase of 47.6% → 86.6% (+39.0 pp), N-Gain ≈ 74.4% (high category). Although the starting point was lower than that of pharmacists, cadres demonstrated a significant leap in competency—particularly in digital education and supporting application use in the community. This aligns with the expected outcomes of 5 trained health cadres.




***Grafic 3.*** Pre-Test & Post-Test Results for the Cadre Group

Overall, both the community and pharmacists and cadres showed an average increase of nearly 40% after the program was implemented. This demonstrates that community service activities through the implementation of telepharmacy not only impact public health literacy but also strengthen the capacity of local health workers. The consistent improvement in both groups also confirms that this program can be used as an effective technology-based empowerment model with potential for replication in other regions (Collado-borell et al., 2022).

Table 2. Pre-test and post-test results of the three groups

| Group | Average Pre-Test | Average Post-Test | Improvement |
|---|---|---|---|
| Community (n=30) | 48% | 87% | +39% |
| Pharmacy Professionals (n=10) | 53% | 91% | +38% |
| Healthcare Workers (n=5) | 47,6% | 86,6% | +39% |

**2. Health-Based Economic Empowerment**

In addition to the health benefits, this program has a direct impact on community economic empowerment. Communities that previously ran simple drugstores now receive training in digital entrepreneurship, inventory management, and social media promotion.

The program also strengthens the upstream-downstream aspects of the business by bridging partners with generic drug distributors and encouraging the use of a digital ordering system through an app developed by the team. The combination of management training, digital marketing, and technology support has successfully enhanced the entrepreneurial readiness of partner communities to become more competitive.

**3. AIK Values in Program Implementation**

The implementation of this program concretely reflects the values of Al-Islam and Muhammadiyah (AIK), such as:

a. Amal Jama'i (collective work for the benefit of the people)
   The involvement of various elements of lecturers, students, local cadres, and the community to strengthen the spirit of collaboration in solving real-world problems.
b. Helping Others
   In accordance with QS. Al-Maidah: 2, "Help one another in righteousness and piety," this program educates the community to share knowledge and assist others in accessing healthcare services.
c. Seeking and Teaching Knowledge
   This program encourages the transfer of knowledge between the academic community and the community, which aligns with the hadith "The best people are those who are most beneficial to others" (Narrated by Ahmad).
d. Professionalism and Trustworthiness
   These values are applied in the training of healthcare workers to provide services based on expertise and moral responsibility to the community.
e. Social Justice
   The program's implementation in remote villages such as Paninggaran, Petungkriyono, and Linggoasri demonstrates a commitment to marginalized communities lacking access to technology and healthcare services.
f. Professionalism and Trustworthiness
   These values are applied in the training of healthcare workers to provide services based on expertise and moral responsibility to the community.

## Conclusion

This community service program has successfully implemented innovative technology-based healthcare services through telepharmacy for communities in rural areas of Pekalongan Regency. The results of the activity indicate that:

1. Improved Access to Healthcare Services:
   Communities who previously experienced limited access to drug information now have broader and easier access through the telepharmacy platform. Both in-person and digital education have successfully raised awareness of the importance of pharmacy consultations.
2. Empowerment of Healthcare Workers and Local Cadres:
   Intensive training for pharmacists and healthcare cadres has increased their capacity in using technology and providing health education. This has also strengthened community independence in managing healthcare services.
3. Community Economic Development:
   Through entrepreneurship training, business digitization, and partnerships with pharmaceutical distributors, partner communities have been able to develop more competitive and sustainable simple drugstore businesses.
4. Integration of AIK Values:
   This program is not only oriented towards physical and technical outputs, but also internalizes Islamic and Muhammadiyah values, such as mutual assistance, professionalism, trustworthiness, and benefit to others, making this service a form of da'wah bil hal (Islamic outreach).
5. Contribution to KPIs and MBKM:
   This activity supports the university's key performance indicators and the implementation of the Independent Learning/Independent Campus (Merdeka Belajar Kampus Merdeka) program through the involvement of lecturers and students in real-life project-based community empowerment.

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