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EFFECTIVENESS OF THE QODU METHOD IN ENHANCING TUBERCULOSIS PROGRAM PLANNING AT PRIMARY HEALTH CENTERS

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ABSTRACT

The success of tuberculosis (TB) control is strongly determined by effective program planning at the primary healthcare level. The 2020–2024 National TB Control Strategy applies a People-Centered Framework (PCF), however, planning methods such as USG, FGD, CARL, and SWOT are often considered complex. This study evaluated the Quadrant of Difficulty–Usefulness (QoDU) method as a simpler and more practical alternative for prioritizing TB programs. A quasi-experimental quantitative design with pre–post design without a control group approach was applied to 34 TB program officers at primary health centers in Jombang Regency, with data analyzed using the Wilcoxon Signed Rank Test. Findings indicated significant improvements across nearly all QoDU variables ($p<0.005$). Median scores for reliability rose from 6 to 8, response time from 6 to 7, usability from 6 to 8, and ease of understanding from 6 to 8. Other aspects such as completeness, relevance, personalization, and security also improved significantly ($p=0.000–0.002$). Service elements, including assurance, empathy, and responsiveness, showed notable progress. From the user perspective, satisfaction, willingness to reuse, and overall experience increased. Efficiency gains included cost savings, wider coverage, and time efficiency. In conclusion, QoDU proved easier, faster, more efficient, and generated better-quality data than conventional methods. It shows strong potential for broader application in health programs and, with digitalization, may enhance planning effectiveness and accelerate TB elimination efforts.

Keywords: Tuberculosis, program planning, QoDU, Effectiveness, Primary health centers

ABSTRAK

Keberhasilan pengendalian tuberkulosis (TBC) sangat ditentukan oleh efektivitas perencanaan program di tingkat layanan kesehatan primer. Strategi Nasional Pengendalian TBC 2020–2024 telah menerapkan *People-Centered Framework* (PCF); namun, metode perencanaan seperti USG, FGD, CARL, dan SWOT sering dianggap rumit. Penelitian ini bertujuan mengevaluasi metode *Quadrant of Difficulty–Usefulness* (QoDU) sebagai alternatif yang lebih sederhana dan praktis dalam menentukan prioritas program TBC. Desain penelitian menggunakan kuasi-eksperimen kuantitatif dengan pendekatan *pre–post test tanpa control* pada 34 petugas program TBC di puskesmas Kabupaten Jombang. Analisis data dilakukan dengan *Wilcoxon Signed Rank Test*. Hasil penelitian menunjukkan adanya peningkatan signifikan pada hampir semua variabel QoDU ($p<0,005$). Median reliabilitas meningkat dari 6 menjadi 8, kecepatan respon dari 6 menjadi 7, kegunaan dari 6 menjadi 8, serta kemudahan pemahaman dari 6 menjadi 8. Aspek kelengkapan, relevansi, personalisasi, dan keamanan juga meningkat signifikan ($p=0,000–0,002$). Unsur pelayanan seperti jaminan, empati, dan daya tanggap mengalami kemajuan. Dari perspektif pengguna, kepuasan, kesediaan untuk menggunakan kembali, dan pengalaman secara keseluruhan meningkat. Efisiensi juga bertambah dengan adanya penghematan biaya, cakupan yang lebih luas, dan penghematan waktu. Kesimpulannya, QoDU terbukti lebih mudah, cepat, efisien, serta menghasilkan data yang lebih berkualitas dibandingkan metode konvensional. QoDU berpotensi diterapkan lebih luas pada program kesehatan lain dan, dengan dukungan digitalisasi, dapat meningkatkan efektivitas perencanaan serta mempercepat pencapaian target eliminasi TBC

Kata kunci: Tuberkulosis, Perencanaan program, QoDU, Efektivitas, Puskesmas

INTRODUCTION

Tuberculosis (TB) control remains a key performance indicator in the health sector, involving coordinated efforts from primary health centers to the national level. Globally, TB is the second leading cause of death from infectious diseases, with Indonesia ranking second after India in terms of TB burden (WHO, 2024). In 2022, global TB treatment coverage reached 75%, while Indonesia achieved 77.5%, still below the national target of 90% (Kemenkes RI, 2024). At the local level, TB control performance in Jombang Regency has shown considerable fluctuation, with the Case Detection Rate (CDR) declining from 72% in 2019 to 49.4% in 2021, before increasing to 84.2% in 2022 (Dinas Kesehatan Kabupaten Jombang, 2023). These trends highlight persistent challenges in TB program implementation, particularly at the primary health care level.

The effectiveness of TB control programs is influenced by multiple factors, including resource availability, communication, bureaucracy, implementers' commitment, and community participation (Mayditania, 2023). Among these factors, effective and efficient program planning at primary health centers plays a critical role. The National TB Control Strategy 2020–2024 adopts a People-Centered Planning Framework (PCF), which emphasizes problem prioritization, root cause analysis, and strategic intervention optimization (Kemenkes RI, 2020). However, translating this framework into practical and efficient planning tools at the primary care level remains challenging.

In Jombang Regency, TB program planning at primary health centers still relies on several conventional priority-setting methods, such as Urgency Seriousness Growth (USG), Focus Group Discussion (FGD), Capability Accessibility Readiness Leverage (CARL), and Strengths Weaknesses Opportunities Threats (SWOT). While widely used, these methods involve multiple assessment dimensions and complex procedures, which may reduce efficiency and practicality in routine program planning. Consequently, there is a need for a simpler and more operational method that can support timely and accurate decision-making.

The Quadrant of Difficulty–Usefulness (QoDU) method has been proposed as an alternative approach to address these limitations. QoDU focuses on only two core elements difficulty and usefulness and visualizes priorities through a quadrant matrix, making it easier for users to identify and select priority programs. Previous studies have applied QoDU and related methods in various contexts, including learning priority-setting in health education, public health issue prioritization, disaster preparedness, and health program management (Nugroho et al., 2020 ;Sunarto et al., 2024). However, empirical evidence regarding the specific application of QoDU in tuberculosis program planning remains limited; therefore, this method has the potential to serve as a promising and relevant approach for implementation in health program planning at the primary care level(Sukartini et al., 2024).

Given the limited empirical evidence on the application of the Quadrant of Difficulty–Usefulness (QoDU) method in tuberculosis program planning, a robust and comprehensive framework is needed to evaluate its performance and effectiveness. Evaluating the performance of a planning method requires a comprehensive effectiveness framework. The DeLone and McLean Information System Success Model is widely used to assess effectiveness through multiple dimensions, including system quality, information quality, service quality, user satisfaction, usage, and net benefits such as time and resource efficiency (DeLone & McLean, 2003). This model has been successfully applied to evaluate systems and methods across public service and health-related settings (Wara et al., 2021), with user satisfaction recognized as a key determinant of method acceptance and continued use (May & Fanida, 2022).

Therefore, this study aims to evaluate the effectiveness of the Quadrant of Difficulty–Usefulness (QoDU) method in supporting tuberculosis program planning at primary health centers in Jombang Regency and to compare its performance with existing planning methods. By focusing on effectiveness indicators such as system quality, information quality, service quality, user satisfaction, and resource efficiency, this study seeks to provide empirical evidence on the potential of QoDU as a practical, evidence-informed planning tool for strengthening TB control programs at the primary care level.

METHOD

This study employed a quasi-experimental pre–post design without a control group to assess changes in tuberculosis program planning indicators following implementation of the QoDU method.The research was conducted at primary health centers in Jombang Regency, with all TB program officers (n = 34) serving as respondents (Creswell, J. W., & Plano Clark, 2018). The study population consisted of TB program officers from 34 primary health centers in Jombang Regency. The sample size was determined using a saturated sampling method, and total sampling was applied, resulting in 34 respondents.

The study variables included independent and dependent variables. The independent variable was the implementation of the Quadrant of Difficulty–Usefulness (QoDU) method, measured by pre-test and post-test conditions following the trial application of the method in TB program planning at primary health centers. The dependent variable was the effectiveness of the QoDU method implementation, evaluated through six dimensions of the Information Systems Success Model (DeLone & McLean, 2003) with 19 measurement indicators as follows: System quality: adaptability, availability, reliability, response time, and usability. Information quality: ease of understanding, completeness, relevance, personalization, and security. Service quality: assurance, empathy, and responsiveness. User: frequency of method usage in the planning process. User satisfaction: satisfaction level and willingness to reuse. Net benefits: contribution of the method to cost savings, market expansion, and time savings. All indicators were measured using a Likert-scale questionnaire,

with pre-test and post-test scores compared to assess changes in effectiveness after QoDU implementation.

The study began with a pre-test to evaluate the effectiveness of the priority-setting methods previously used by the respondents. This was followed by a dissemination session where the QoDU method was explained by the researcher. Respondents then participated in a trial application of QoDU to prioritize success elements of the TB program based on the National TB Elimination Strategy (Kemenkes, 2023) This process involved assessing the difficulty and usefulness dimensions, which were then mapped into four quadrants. After the trial, a post-test was conducted using a questionnaire developed from the DeLone and McLean Information Systems Success Model (Kemenkes, 2023). Data were analyzed using the Wilcoxon Signed Rank Test, as normality tests indicated that the data were not normally distributed and therefore did not meet the assumptions for a paired t-test.

RESULTS AND DISCUSSION

The characteristics of the 34 respondents involved in the tuberculosis (TB) program, as presented in Table 1, show that most participants were female (67.6%) and predominantly aged 35–44 years (52.9%). More than half of the respondents held a diploma degree (D1–D3) (58.8%), while 41.2% had a bachelor's degree (S1). The majority of respondents were program implementers (79.4%), and 20.6% were involved as planners. Most respondents had more than 10 years of work experience (73.5%) and were mainly based in rural areas (82.4%). In terms of training, 76.5% had attended TB program planning training, and 70.6% had been involved in priority-setting activities. Almost all respondents (97.1%) reported the need for further training, with the most frequently requested topics including the use of planning applications or software (44.1%), health advocacy and policy (23.5%), evidence-based priority-setting techniques (17.6%), and the use of data in program planning (14.7%).

The predominance of female respondents may reflect the composition of the primary healthcare workforce, where nurses and midwives constitute a substantial proportion of TB program implementers. The dominance of the 35–44 years age group suggests that TB program implementation is largely carried out by personnel in their productive working age. Furthermore, the high proportion of respondents with diploma-level education may indicate the need for continuous capacity building, particularly in strategic planning competencies. The predominance of rural postings may also have implications for program implementation due to contextual challenges commonly encountered in rural health service delivery.

Table 1. ***Demographic and Professional Characteristics of TB Program Respondents***

Variables	n	%
Gender		
Male	11	32.4
Female	23	67.6
Age (years)		
25–34 years	4	11.8
35–44 years	18	52.9
45–54 years	9	26.5
>55 years	3	8.8
Education		
Diploma (D1–D3)	20	58.8

Bachelor's Degree (S1)	14	41.2
Role in TB Control Program		
Healthcare worker (doctor/nurse/midwife)	7	20.6
TB program officer	27	79.4
Work Experience		
1–5 years	5	14.7
6–10 years	4	11.8
10 years	25	73.5
Work Area Characteristics		
Urban	5	14.7
Rural	28	82.4
Remote	1	2.9
Ever Attended TB Program Planning Training		
Yes	26	76.5
No	8	23.5
Ever Involved in Priority-Setting in Health Program Planning in Work Area		
Yes	24	70.6
No	10	29.4
Frequency of Involvement in TB Program Planning		
Never	3	8.8
Sometimes	9	26.5
Often	14	41.2
Always	8	23.5
Involvement in TB Program Priority Decision-Making		
Minor role	9	26.5
Moderate role	25	73.5
Need for Training in Priority-Setting for TB Program		
Yes, needed	33	97.1
No	1	2.9
Most Needed Training Topics		
Use of data in program planning	5	14.7
Evidence-based priority-setting techniques	6	17.6
Use of planning tools or software	15	44.1
Health advocacy and policy-making	8	23.5

The priority-setting methods and related conditions previously used in TB program planning are presented in Table 2. Regarding the availability of a dedicated TB program planning team, most respondents reported that such a team was available in their work area (79.4%), while 20.6% indicated that it was not. In terms of access to TB program data or reports, 50.0% of respondents reported often accessing data, 38.2% reported always accessing data, and 11.8% reported accessing data only sometimes. Concerning the methods used for TB program priority-setting, most respondents reported using the Urgency Seriousness Growth (USG) method (91.2%), while Focus Group Discussion (FGD) and SWOT (Strengths, Weaknesses, Opportunities, Threats) were used by 5.9% and 2.9% of respondents, respectively. With regard to perceived effectiveness, 94.1% of respondents rated the priority-setting methods as effective, and 5.9% rated them as very effective. The main challenges reported in TB program priority-setting included lack of coordination among stakeholders (38.2%), limited human resources (32.4%), and budget constraints (17.6%).

Table 2 ***Priority-Setting Methods Previously Applied in TB Program Planning***

Variables	n	%
Availability of a Dedicated TB Program Planning Team		

Yes	27	79.4
No	7	20.6
Frequency of Accessing TB Program Data or Reports		
Sometimes	4	11.8
Often	17	50.0
Always	13	38.2
Methods Used in TB Program Priority-Setting		
Urgency Seriousness Growth (USG)	31	91.2
Focus Group Discussion (FGD)	2	5.9
Strengths, Weaknesses, Opportunities, Threats (SWOT)	1	2.9
Perceived Effectiveness of Priority-Setting Methods		
Very effective	2	5.9
Effective	32	94.1
Main Challenges in TB Program Priority-Setting		
Limited human resources	11	32.4
Lack of coordination among stakeholders	13	38.2
Limited budget	6	17.6

Table 3 presents the analysis of the effectiveness of TB program planning using the Quadrant of Difficulty–Usefulness (QoDU) matrix. This study aimed to evaluate the effectiveness of the QoDU method in TB program planning at primary health centers. The Wilcoxon Signed Rank Test results showed that nearly all variables in the QoDU matrix demonstrated significant differences between pre- and post-intervention. These findings indicate that the implementation of the QoDU method was associated with significant improvements in tuberculosis program planning indicators, including system quality, information quality, service quality, user satisfaction, and resource efficiency.

Based on the Wilcoxon Signed Rank Test, nearly all variables in the Quadrant of Difficulty–Usefulness (QoDU) matrix showed significant differences before and after the TB program planning intervention. The dimensions of Reliability, Response Time, Usability, and Ease of Understanding also experienced significant improvements ($p<0.005$). The median scores for reliability increased from 6 to 8, response time from 6 to 7, usability from 6 to 8, and ease of understanding from 6 to 8. This indicates that the planning system used is more understandable, more reliable, and more responsive. The dominance of positive ranks in these four variables further strengthens the evidence of substantial improvement after the intervention.

In the aspects of completeness, relevance, personalization, and security, all variables increased with p-values ranging from 0.000 to 0.002. This shows that the planning system is capable of presenting information that is more complete, relevant, tailored to user needs, and secure. Although there were some negative ranks and ties, their numbers were relatively small and did not diminish the overall evidence of increased effectiveness.

Table 3 Effectiveness Analysis of TB Program Planning Based on the Quadrant of Difficulty–Usefulness (QoDU) Matrix

Variable	Before (Median, min–max)	After (Median, min–max)	Negative Ranks	Positive Ranks	Ties	Z	p-value
1. Adaptability	6 (2-10)	7 (5-10)	8	21	5	-3.15[b]	0.002
2. Availability	7 (3-10)	8 (5-10)	9	18	7	-2.93[b]	0.003

3. Reliability	6 (3-10)	8 (4-10)	5	26	3	-3.76[b]	0.000
4. Respons Time	6 (2-10)	7 (5-10)	6	25	3	-3.51[b]	0.000
5. Usability	6 (3-10)	8 (5-10)	8	22	4	-3.41[b]	0.001
6. Ease Of Understanding	6 (3-10)	8 (5-10)	9	22	3	-2.97[b]	0.003
7. Completeness	6 (3-10)	8 (5-10)	6	23	5	-3.49[b]	0.000
8. Relevance	6 (3-10)	8 (6-10)	7	23	4	-3.53[b]	0.000
9. Personalization	6 (4-10)	8 (6-10)	3	26	5	-3.95[b]	0.000
10. Security	6 (3-10)	8 (6-10)	9	22	3	-3.04[b]	0.002
11. Assurance	6 (3-10)	7,5 (6-10)	8	22	4	-3.13[b]	0.003
12. Empathy	6 (2-10	8 (4-10)	8	22	4	-2.82[b]	0.005
13. Responsiveness	6 (3-10)	8 (6-10)	8	21	5	-3.19[b]	0.001
14. User	6,5 (3-10)	8 (4-10)	8	21	5	-2.91[b]	0.004
15. Satisfaction Level	6 (3-10)	8 (6-10)	8	23	3	-3.17[b]	0.001
16. Willingness To Reuse	6 (3-10)	8 (4-10)	8	20	6	-3.43[b]	0.001
17. Cost Saving	7 (3-10)	8 (5-10)	10	21	3	-2.72[b]	0.006
18. Expanded Market	6 (2-10)	8 (6-10)	9	23	2	-3.27[b]	0.001
19. Time Saving	6 (3-10)	8 (4-10)	11	23	0	-3.15[b]	0.002

The application of the Quadrant of Difficulty–Usefulness (QoDU) framework was associated with statistically significant improvements across multiple dimensions of the DeLone and McLean Information Systems Success Model, including system quality, information quality, service quality, user satisfaction, and perceived efficiency. In the user-related domain, satisfaction and willingness to reuse the method increased significantly ($p<0.005$), although several ties were observed, indicating that not all respondents perceived change. These findings suggest that QoDU may contribute to a more positive user experience in program planning.

Improvements were also observed in the efficiency dimension, including cost saving, expanded market, and time saving, with median scores increasing from 6–7 to 8 ($p<0.005$), indicating better perceived efficiency in resource utilization. In the system quality dimension, indicators such as reliability, response time, usability, and ease of understanding showed significant increases ($p<0.005$), suggesting that the planning process following QoDU implementation was perceived as more user-friendly and functional. This pattern is consistent with the DeLone and McLean model, which emphasizes the role of system quality in influencing system use and user satisfaction (DeLone & McLean, 2003).

Significant improvements were also observed in information quality, including completeness, relevance, personalization, and security ($p=0.000–0.002$). Although some ties and negative ranks were present, the overall trend indicated better perceived information quality, which is important for

evidence-informed program planning (McGrath et al., 2022). The service quality dimension, particularly assurance, empathy, and responsiveness, also showed statistically significant improvements, suggesting that QoDU implementation may be associated not only with technical aspects of planning but also with perceived improvements in service-related interactions, consistent with SERVQUAL dimensions (Alfatafta et al., 2025).

The observed improvements may be partly explained by the simplicity of the QoDU framework, which focuses on only two core criteria (difficulty and usefulness) and uses quadrant-based visualization. This structure may reduce cognitive burden and facilitate faster consensus-building among program staff, particularly in primary health care settings characterized by high workload and limited time for complex planning procedures. However, the presence of ties suggests that variations in prior familiarity with existing planning methods, adaptability to new tools, and levels of methodological or digital literacy may influence individual perceptions of change.

These findings are broadly consistent with previous studies reporting that structured and user-centered decision-support tools are associated with improved usability, user satisfaction, and perceived efficiency in public health program planning (Akpinar et al., 2025;Azadi & García-Peñalvo, 2025). While much of the existing literature focuses on digital health systems or surveillance platforms, the present study extends this evidence to TB program planning using the QoDU framework in primary health care settings, aligning with global recommendations promoting evidence-informed and people-centered planning approaches (da Silva et al., 2016 ; Pinto et al., 2018)

From a practical perspective, QoDU may serve as a complementary planning tool rather than a replacement for existing priority-setting methods. Its integration into routine planning processes, supported by brief and targeted capacity-building initiatives, may enhance acceptability and usability among program staff. Nevertheless, structural and organizational factors such as human resource capacity, stakeholder coordination, leadership support, and budget availability remain important contextual determinants that may influence the successful implementation of planning innovations (Solikha et al., 2025).

Finally, these findings should be interpreted with caution because the improvements are based on self-reported perceptions and the absence of a control group limits causal inference. Therefore, the results indicate perceived improvements following QoDU implementation rather than definitive evidence of effectiveness. Further studies using comparative designs and objective performance indicators are warranted to better assess the impact of QoDU on TB program outcomes.

Overall, this study suggests that the QoDU method shows potential to enhance both the effectiveness and efficiency of tuberculosis program planning at community health centers. Accordingly, QoDU may be considered an innovative, evidence-informed approach for supporting health program prioritization at the primary care level.

LIMITATION OF THE STUDY

The time span between the socialization, trial, and post-test phases was relatively short, which may have limited respondents opportunities to fully understand the implementation process. Additionally, not all respondents were able to conduct the trial independently. Importantly, the use of a quasi-experimental pre–post design without a control group limits causal inference, as the observed changes cannot be attributed exclusively to the QoDU intervention and may have been influenced by external or temporal factors.

CONCLUSIONS AND SUGGESTIONS

The findings suggest that the Quadrant of Difficulty Usefulness (QoDU) method shows potential to enhance the quality of tuberculosis program planning at community health centers. Wilcoxon test results demonstrated significant improvements across several indicators, including system quality, information quality, service quality, user satisfaction, and resource efficiency. Therefore, QoDU may serve as an evidence-informed approach to support tuberculosis program planning at the primary care level.

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ETHICAL CONSIDERATIONS

Ethical approval for this study was obtained from the Ethics Committee of Universitas Pesantren Tinggi Darul Ulum with number: 100-KEP-Unipdu/08/2025

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