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Effect of Telehealth Implementation on Outpatient Anxiety Level

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ABSTRACT

Anxiety in outpatients is a psychological problem that often arises due to long lines, limited consultation time, and concerns about diagnosis and therapy. The use of telehealth as a technology-based health service innovation has the potential to improve patient access, efficiency, and comfort so that it can reduce anxiety levels. However, the scientific evidence regarding the effectiveness of telehealth on outpatient anxiety in Indonesia is still limited. This study aims to analyze the effect of the application of telehealth on the level of anxiety of outpatients in Dr. Hasan Sadikin Bandung. This study used a quasi-experimental design with one group pretest-posttest approach without a control group. A sample of 80 outpatients were selected using acidental sampling technique according to inclusion and exclusion criteria. Interventions in the form of telehealth services are provided during scheduled consultation periods. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) instrument before and after the intervention. Data analysis was conducted using paired t-test to determine the difference in the average anxiety score before and after the application of telehealth with a significance level of p<0.05. The results showed that the average anxiety score before the intervention was 25.1 ± 5.4 and decreased to 16.2 ° 4.9 after the implementation of telehealth. The paired t-test results showed a statistically significant difference (p=0.000), with an average decrease of 8.9 points. It was concluded that the application of telehealth has a significant effect in reducing the level of outpatient anxiety. Operational implications of this study is the need for optimization of telehealth services as part of outpatient service standards to support the comfort and psychological stability of patients.

Keywords *: Telehealth, Policy, Patient, Service*

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INTRODUCTION

Along with the rapid development of information technology, the world of health has also undergone significant transformations, one of which is through the use of telehealth. Telehealth, which allows communication between patients and health workers without face-to-face, offers solutions to overcome geographical limitations, costs, and time that are often obstacles in conventional health services. This technology can improve efficiency, speed up services, and provide comfort for patients. Therefore, telehealth has become especially relevant in the context of outpatient care, where patients often face psychological challenges, one of which is anxiety (WHO, 2022).

Anxiety in outpatients is often caused by factors such as long waiting times, uncertainty in the results of the diagnosis, as well as difficulties in communicating with medical personnel. This condition can worsen the physical state of patients and affect their quality of life. The World Health Organization (WHO) notes that anxiety disorders are a growing mental health problem, especially in patients with chronic diseases that require long-term treatment. Therefore, understanding ways to reduce outpatient anxiety is important in efforts to improve the overall quality of health care (WHO, 2023).

In the context of outpatient health care, anxiety is often the main obstacle to patient adherence to therapy and medication. Anxious patients are often unable to focus on medical consultations or even tend to avoid repeated visits due to feelings of fear or discomfort. Putri & Handayani's (2022) research shows that poorly treated anxiety can worsen a patient's medical condition, increase the risk of complications, and increase treatment costs. Several studies have also shown that psychological factors, especially anxiety, have a significant relationship with patient compliance in undergoing treatment, where high levels of anxiety can reduce patient adherence to therapy provided by health workers (Agus et al., 2024; Anjarsari & Hudiyawati, 2023). This is in line with the findings of studies showing that patients with higher levels of anxiety tend to have lower levels of treatment adherence compared to patients who have low or controlled levels of anxiety. Therefore, it is important to identify the factors that influence anxiety and develop appropriate interventions to reduce this psychological impact so that patient adherence to therapy can improve.

One of the innovative approaches that can be done to reduce the problem is to implement telehealth as an alternative solution in outpatient services. Remote health involves patients consulting with medical personnel remotely, providing a sense of security, and alleviating concerns that arise due to time and location constraints. Research by Garcia & Lopez (2023) suggests that the use of telehealth can significantly reduce patient anxiety levels, especially for those with a long-term medical background. This finding is also supported by other studies showing that telemedicine-based health services are effective in helping reduce anxiety and improve patients ' mental health conditions through more convenient and flexible remote consultations (Shaker et al., 2023).

Although telehealth offers many positive potentials, its implementation in Indonesia still faces some challenges. In Indonesia, the adoption of digital Health Technologies has recently experienced a significant surge, especially after the COVID-19 pandemic, which forced health systems to adapt to remote service models. According to data from the Ministry of Health (2023),

despite the increase in the use of telehealth, there is still uncertainty regarding its effectiveness in reducing patient anxiety, especially in large referral hospitals such as RSUP Dr. Hasan Sadikin. Therefore, further research is needed to evaluate the impact of telehealth on outpatient anxiety levels in Indonesia.

Dr. Hasan Sadikin Bandung is one of the national referral hospitals that has a high volume of outpatient visits every day. With more than 1,000 outpatients served daily, the hospital faces major challenges in managing queues, especially for patients with anxiety disorders who need increased attention. According to the profile of the hospital (2023), Dr. Hasan Sadikin has implemented telehealth services to improve access and efficiency, but their impact on patient anxiety levels has not been widely studied. This hospital study could provide valuable insights into the effect of telehealth on reducing anxiety in outpatients.

While there have been several studies exploring the benefits of telehealth in the context of health care, the majority of those studies have focused on patient satisfaction or time efficiency, rather than on its impact on patients anxiety. For example, research by Nugroho et al. (2022), which examined the use of teleconsultation in teaching hospitals, showed that telehealth was associated with increased patient satisfaction, but did not specifically address anxiety levels. This indicates a gap in the literature that needs to be filled with more research focused on the effect of telehealth on psychological factors, in particular anxiety.

In addition, studies related to the reduction of anxiety through telehealth are generally carried out in patients with chronic diseases or certain medical conditions, such as diabetes or hypertension. Research by Smith et al. (2022) showed that telehealth plays a role in reducing anxiety in patients with chronic diseases, but data for outpatients with different types of medical complaints are still limited. This shows the importance of research focusing on a more diverse group of outpatients, to understand more broadly the impact of telehealth on patient anxiety in Indonesia.

In Indonesia, cultural factors and technology access also play an important role in the successful implementation of telehealth. Although telehealth services have been introduced in some large hospitals, not all patients can access these services easily, especially for those who live in remote areas or are less familiar with technology. Based on research by Sari et al. (2023), this digital divide may affect the effectiveness of telehealth use in reducing patient anxiety. Therefore, research that considers the factors of access and technological skills becomes very important to understand the barriers that exist.

The anxiety that outpatients experience not only impacts their quality of life, but can also affect their adherence to medication and the treatment plan established by the doctor. In this sense, telehealth has the potential to reduce anxiety by providing patients with a greater sense of control, as they can access medical information and support anytime and anywhere. Research by Lee & Kim (2022) suggests that a responsive telehealth service model can increase a patient's sense of security, which is associated with a significant reduction in anxiety levels.

Based on the available evidence, it is important to conduct further research to empirically evaluate the effect of telehealth on outpatient anxiety, especially in Indonesia. Telehealth has the

potential to be a very effective intervention in reducing anxiety, given the ability of this technology to offer flexibility in communication and medical consultation. Therefore, appropriate research design is needed to test this hypothesis, which can provide strong scientific evidence to develop digital-based health care policies in Indonesia (Polit & Beck, 2022).

In this case, the design of the research used is essential to ensure the results are valid and can be applied in a real context. Quasi-experimental design with pretest-posttest approach without a control group can be the right choice, given the limitations in the formation of control groups in hospitals that have implemented telehealth routinely. This design allows measuring changes in patient anxiety levels before and after the intervention, which provides a clearer picture of the effectiveness of telehealth in an outpatient context (Polit & Beck, 2022).

Through this study, it is expected to find evidence showing that the application of telehealth in Dr. Hasan Sadikin has a significant effect in reducing the anxiety level of outpatients. This study also aims to provide operational recommendations for hospitals and health policies to further optimize the use of telehealth in outpatient services. The results of this study are expected to make a major contribution to the development of digital health systems in Indonesia, especially in improving the quality of patient care.

Researchers ' interest in this topic stems from observations of complaints of outpatients who often complain of anxiety while waiting for a consultation, as well as attention to the increased use of telehealth services in such hospitals. The desire to fill the void of existing research on the impact of telehealth on outpatient anxiety was the main reason for the researchers to conduct this study. This phenomenon provides great potential for analyzing the relationship between technology and anxiety as well as for finding more effective ways of improving the quality of health care.

METHODS

This study used a quasi-experimental design with a one group pretest-posttest approach without a control group to identify changes in anxiety levels before and after the implementation of telehealth. This design was chosen because telehealth interventions have become part of the service system and therefore do not allow the formation of comparison groups ethically or operationally. The study was conducted on outpatient departments at Dr. Hasan Sadikin Bandung during the period of scheduled service. This approach allows researchers to directly evaluate the effects of interventions in the context of real clinical practice.

The study sample was 80 outpatients who were selected using accidental sampling technique in accordance with the inclusion and exclusion criteria that have been set. Inclusion criteria include patients who are 18 years old, able to communicate well, have device access for telehealth, and willing to be a respondent by signing informed consent. Exclusion criteria included patients with severe cognitive impairment, a previously diagnosed psychiatric disorder, or an emergency medical condition. This study guarantees the principle of confidentiality, anonymity, and the right of respondents to resign at any time without consequences for the medical services received.

Intervention in the form of telehealth services is provided in the form of scheduled online consultations according to hospital procedures. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) instrument before (pretest) and after (posttest) the implementation of telehealth. The Data obtained were analyzed using the paired t-test to determine the difference in mean anxiety scores before and after the intervention, with the significance level set at $p<0.05$. This test was chosen because it is appropriate to compare two paired measurements in the same group and to ascertain whether the changes that occur are statistically significant.

RESULTS

1. Distribution of Respondent Characteristics

Table 1. Distribution of Respondents Characteristics (n = 80)

Characteristics	Frequency (n)	Percentage (%)
18-35 years old	28	35.0
Age 36-55 years	34	42.5
Age >55 years old	18	22.5
Men	36	45.0
Female	44	55.0
High school (SMA)	30	37.5
Education > High School	50	62.5

The results showed that most of the respondents were in the age range of 36-55 years (42.5%) and female (55.0%). The majority of respondents have an education level above high school (62.5%). These characteristics indicate that the productive age group dominates the study sample and has a relatively good educational background, so it is generally able to access telehealth services independently.

2. Average Anxiety Score before and after Telehealth Intervention

Table 2. Mean Anxiety Score before and after Telehealth Intervention (N = 80)

Variable	Mean ± SD	Minimum-Maximum
Pretest	25.1 ± 5.4	16–36
Posttest	16.2 ± 4.9	8–28

The results showed that the mean anxiety score before telehealth intervention was 25.1 (SD= 5.4), which belongs to the moderate anxiety category. After the intervention, the mean score decreased to 16.2 (SD= 4.9), which is in the category of mild anxiety. Descriptively, there was an average decrease of 8.9 points after the implementation of telehealth.

3. Differences in Pre-and Post-Telehealth Anxiety Scores

Table 3. Difference in Anxiety Scores Before and After Telehealth (Paired T-Test) (n = 80)

Variabel	Mean Difference	t	p-value	Cohen's d
Pretest–Posttest	8.9	14.72	0,000	1.64

Paired t-test results showed a value of p=0.000 (p<0.05), which means there is a significant difference between anxiety scores before and after telehealth intervention. The calculated t value of 14.72 indicates a high strength difference. Cohen's d value of 1.64 indicates a very large effect size (large effect), so it can be concluded that the application of telehealth has a strong and meaningful influence in reducing outpatient anxiety levels.

DISCUSSION

The discussion of univariate results table 2 shows that the average anxiety score of patients before telehealth intervention was 25.1 ± 5.4, which is included in the moderate anxiety category based on the Hamilton Anxiety Rating Scale (HARS) classification. This condition indicates that most outpatients experience significant anxiety symptoms before obtaining digital-based services. These findings show that psychological aspects are still an important issue in outpatient care. This high initial score confirms the urgency of an intervention capable of providing a sense of security and comfort to the patient.

Anxiety in outpatients is generally influenced by the uncertainty of diagnosis, concern about the results of the examination, as well as the length of service waiting time. These factors can trigger emotional responses in the form of restlessness, tension, and impaired concentration. The pretest results in this study are in line with the findings that patients facing the medical consultation process have a higher risk of anxiety than the general population. This condition reinforces that health services need to pay attention to the psychological dimension in addition to the clinical aspect (Putri & Handayani, 2022).

The relatively high mean anxiety score before the intervention can also be associated with the characteristics of tertiary referral hospitals that have more severe case complexity. Patients who come to the referral hospital generally have gone through the previous examination process and have greater concerns about their health condition. Such complexity can increase the perception of threats to personal health. It is this perception of threat that theoretically contributes to increased anxiety (Lazarus & Folkman, 2022).

After being given the telehealth intervention, the average anxiety score decreased to 16.2 ± 4.9, which belongs to the category of mild anxiety. This decrease indicates a change in the patient's emotional state in a more stable direction. Descriptively, the difference in decline of 8.9 points is a clinically meaningful change. This indicates that telehealth has the potential to be an effective intervention strategy in an outpatient context (Garcia & Lopez, 2023).

The decrease in anxiety scores can be explained through comfort theory, which states that access to information and clear communication can increase an individual's sense of control over the

situation at hand. Telehealth allows patients to consult without the pressure of a crowded hospital environment. A more flexible environment tends to lower the stimulation of external stressors. Thus, the patient's psychological state becomes more controlled (Kolcaba, 2022).

This finding is consistent with a recent study that reported that teleconsultation services were able to reduce the anxiety of chronic disease patients through increased access to communication with health workers. More responsive communication helps patients obtain clarification regarding their medical condition. When uncertainty decreases, anxiety levels decrease significantly. This demonstrates the importance of quality interaction in digital services (Smith et al., 2022).

In addition to communication factors, time flexibility in telehealth also plays a role in lowering psychological stress. Patients do not need to face long lines or crowds that can trigger stress. A more conducive situation allows the patient to focus on the consultation process. A minimally distracting environment has been shown to support the emotional stability of patients (Lee & Kim, 2022).

The decrease in the average score also shows that telehealth can provide a sense of security through ease of access to services. Rapid access to health workers creates a stronger perception of social support. Such support is a protective factor against anxiety. Therefore, telehealth not only serves as a medium of communication, but also as a means of psychosocial support (Sari et al., 2023).

Methodologically, the comparison of pretest and posttest mean values in the univariate analysis provides an initial picture of the effectiveness of the intervention. Although not yet considering statistical significance, the difference in average values shows a clear downward trend. This descriptive analysis becomes the basis for further testing at the bivariate stage. Thus, univariate results have an important role in the overall interpretation of the study (Polit & Beck, 2022).

The score variability indicated by the standard deviation also decreased slightly after the intervention. This indicates that in addition to lowering the average anxiety, telehealth also tends to make the score more homogeneous. This condition indicates that the benefits of intervention are felt by most respondents. In other words, the effects of telehealth are relatively consistent in the study population (Garcia & Lopez, 2023).

From a health psychology perspective, anxiety often arises as a result of an imbalance between the demands of the situation and the individual's ability to cope with it. Telehealth helps reduce situational demands such as travel, queues, and social pressures. With the reduced load, the patient's coping capacity becomes more optimal. It is this coping optimization that favors the decrease in anxiety scores (Lazarus & Folkman, 2022).

Researchers analyzed that the ease with which technology is used also contributes to these results. The majority of respondents have an education level above high school so they are relatively able to operate digital devices. Such capabilities reduce technical barriers that can trigger additional frustration or anxiety. Therefore, the characteristics of respondents also strengthen the effectiveness of telehealth (Nugroho et al., 2022).

This finding is also supported by reports that personalized digital interactions can increase patient confidence in submitting complaints. Patients tend to be more open when they are in a

comfortable environment. This openness helps health workers provide more targeted education. Comprehensive education plays a role in lowering anxiety (Lee & Kim, 2022).

Although there was a significant decrease in descriptive, some respondents still showed anxiety scores in the mild category. This suggests that telehealth is not the only factor affecting the psychological state of patients. Internal factors such as personality and history of medical experience still play a role. Therefore, a multidimensional approach remains necessary (WHO, 2023).

Overall, the univariate results showed a positive pattern of change after the intervention. This pattern shows that digital-based service innovation can provide real benefits for the psychological well-being of patients. The integration of psychological aspects in the evaluation of Health Services is becoming increasingly important in the era of digital transformation. This is in line with the paradigm of Patient-centered Care (Ministry of Health, 2023).

The researchers consider that these results reinforce the urgency of the systematic development of telehealth in the hospital service system. Not only as an alternative during certain conditions, but as part of routine service standards. With good management, telehealth can be a promotive and preventive instrument against anxiety disorders. This strategy is in line with the holistic health approach (Smith et al., 2022).

In addition, this finding implies that the measurement of anxiety needs to be an indicator of the evaluation of the quality of outpatient care. During this time, the evaluation focuses more on waiting times or patient satisfaction. In fact, emotional stability has a great contribution to therapy compliance and clinical outcomes. Therefore, the psychological dimension needs to be integrated in service quality indicators (Putri & Handayani, 2022).

In terms of nursing and medical practice, telehealth can be used to provide further education and brief counseling to maintain a decrease in anxiety. Continuing education helps patients understand their health condition more comprehensively. This understanding strengthens the patient's sense of self-control. An increased sense of control is correlated with a decrease in anxiety (Kolcaba, 2022).

Researcher also see that the success of these interventions depends on the readiness of infrastructure and competence of health workers in using digital technology. Therapeutic communication training in a virtual context is an important aspect to take into account. Without empathic communication, the benefits of telehealth may not be optimal. Therefore, strengthening the capacity of health workers is the main supporting factor (Sari et al., 2023).

Thus, the application of telehealth has a positive impact on reducing the average anxiety score of outpatients. This decline is not only descriptively meaningful, but also has far-reaching clinical and operational implications. These results support the need for integration of telehealth services as part of an evidence-based healthcare quality improvement strategy.

The results showed that the implementation of telehealth was able to significantly reduce the level of outpatient anxiety. This is evidenced by the values $p = 0.000$ ($p < 0.05$) and t count of 14.72, which indicates that the difference in anxiety scores before and after the intervention is not accidental, but a real effect of telehealth use. Clinically, this decrease is significant because it shows

that patients feel the psychological benefits of remote service access. These findings support the idea that telehealth is an effective intervention tool for anxiety management.

Cohen's D Effect size of 1.64 indicates that the effect of telehealth on anxiety is very large. This suggests that changes in patients ' anxiety scores are not only statistically significant but also have a real clinical impact. With an effect of this magnitude, telehealth can be considered an effective and powerful intervention in the practice of outpatient care. These findings are in line with psychometric standards that rate $d > 0.8$ as a large effect.

Recent literature shows that telehealth is effective in lowering anxiety in a wide range of populations, including cancer patients, patients with chronic diseases, and patients with mental disorders. Meta-analysis showed that digital intervention provided a significant reduction in anxiety symptoms when compared to conventional treatments. This reinforces the empirical evidence that telehealth has an important role in the management of psychological conditions. These findings demonstrate the global relevance of telehealth use for anxiety reduction (Yang et al., 2024).

Telehealth provides practical benefits such as easier access to services, reduction of physical barriers, and flexibility of consultation time. All of these factors contribute to a more comfortable patient experience and lower stress related to physical clinic visits. This reduction in barriers corresponds to the anxiety reduction theory, which states that Environmental Control and access to services affect the level of anxiety of patients. Therefore, this mechanism supports the significant results found in this study (Shaker et al., 2023).

Some studies also report that telehealth is comparable or even superior to face-to-face care for anxiety management. This reinforces the conclusion that the decrease in outpatient anxiety is not an accidental phenomenon. Telehealth allows patients to still receive quality services without the added stress of a physical visit. Thus, telehealth offers a valid and effective alternative to anxiety management (Krzyzaniak et al., 2024).

From a psychological perspective, telehealth reduces anxiety by providing the patient with a sense of control over the consultation process. The patient can choose a comfortable time and environment for interaction, so that the level of anxiety arising from the uncertainty of the visit is reduced. This mechanism explains the positive impact of telehealth on anxiety scores statistically. In other words, telehealth is not just a substitution method, but a significant psychological strategy (Shaker et al., 2023).

In addition, telehealth increases patient involvement in care because patients feel more responsible for their participation. This involvement has an impact on adherence to the intervention, so that the management of anxiety becomes more effective. More involved patients tend to experience more rapid and consistent symptom relief. This confirms the importance of telehealth as part of an integrated care strategy (Yang et al., 2024).

Studies in patients with other chronic diseases, such as COPD, also showed that telehealth was able to significantly reduce anxiety although the effects on depression varied. This indicates that telehealth can be widely applied to the management of anxiety in various conditions. This effect

is consistent with the results of the outpatient study under discussion. Telehealth proved to be an adaptive multifunctional intervention (Zhang et al., 2025).

Another factor that favors the effectiveness of telehealth is the quality of the service and the technology used. Positive patient experiences increase the perception of self-control and psychological comfort. This reinforces the effect of the intervention on anxiety reduction. Therefore, the management of technology and services is a critical factor in the implementation of telehealth. These findings validate that appropriately implemented telehealth strategies can improve the quality of life of patients with high anxiety, and that the integration of digital services in healthcare should continue to be developed so that their benefits can be optimized across a wide range of clinical settings, including outpatient.

CONCLUSIONS

The results of this study showed that the implementation of telehealth significantly reduced the level of anxiety of outpatients. The mean pre-intervention anxiety score was included in the moderate category based on the Hamilton Anxiety Rating Scale (HARS), which indicates that patients experienced significant anxiety symptoms before receiving digital services. A significant decrease in the anxiety score, evidenced by the values $p = 0.000$ and t count of 14.72, indicates that the effect of telehealth is not accidental, but rather provides real psychological benefits to the patient. These findings confirm that telehealth can be an effective intervention tool for the management of anxiety in outpatients.

In addition, Cohen's D effect size of 1.64 indicates that the influence of telehealth is very large clinically, so the difference in anxiety scores before and after the intervention is not only statistically significant, but also practically significant. This suggests that telehealth can be effectively applied in outpatient care practices to help patients manage their anxiety. These findings are in line with psychometric standards that rate $d > 0.8$ as a major effect, which confirms the strength and clinical relevance of digital interventions in the context of mental health services.

However, this study has limitations, especially regarding the design of pre-post studies without a control group and a relatively limited number of samples, so the generalization of the results needs to be done with caution. Subsequent studies suggested using more robust experimental designs, such as randomized controlled trials (RCTs), with larger samples to reinforce evidence of telehealth effectiveness. In addition, follow-up research can explore moderation factors and mediators, such as the patient's age, education level, or technology experience, so that interventions can be better tailored to individual needs. Thus, telehealth has great potential as an effective psychological intervention strategy, but more research is needed to maximize its application.

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