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Effectiveness of Telecare in Reducing Stress Patients with Chronic Diseases

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ABSTRACT

Chronic diseases such as diabetes mellitus, hypertension, and heart failure require long-term management that often leads to psychological stress in patients. In Bogor City, limited access to face-to-face healthcare services and the burden of routine medical visits may further increase stress levels. Telecare, a remote healthcare model based on communication technology, offers a potential solution to enhance continuous psychosocial support and health monitoring. This study aimed to analyze the effectiveness of telecare in reducing stress levels among patients with chronic diseases in Bogor City. A quasi-experimental design with a pretest-posttest control group approach was employed. A total of 60 patients were selected using purposive sampling, consisting of 30 respondents in the intervention group (receiving telecare for 8 weeks) and 30 in the control group (receiving standard care). Stress levels were measured using the Perceived Stress Scale (PSS-10). Data were analyzed using paired t-tests and independent t-tests with a significance level of 0.05. The results showed a significant reduction in stress scores in the intervention group (24.6 ± 4.2 to 16.8 ± 3.9; $p<0.001$), while the control group showed no significant change ($p=0.087$). Telecare was effective in reducing stress levels and can be implemented in primary healthcare settings to improve patients' psychological well-being.

Keywords: *Telecare, Stress, Chronic, Intervention*

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INTRODUCTION

Chronic diseases are one of the leading causes of morbidity and mortality in the world. The World Health Organization reports that non-communicable diseases such as diabetes mellitus, hypertension, and heart disease contribute to more than 70% of global deaths. This condition not only has an impact on the physical aspect, but also affects the psychological health of the individual. The burden of long-term treatment often causes significant emotional stress on the patient. Therefore, it is necessary to comprehensively manage chronic diseases, including their psychological aspects (WHO, 2023).

Stress is a common psychological response experienced by patients with chronic diseases due to the demands of therapy, lifestyle changes, and concerns about complications (American Psychological Association, 2022). High levels of stress can worsen physical condition through neuroendocrine and inflammatory mechanisms. This suggests a two-way relationship between physical and psychological conditions in chronic patients. Thus, stress control becomes an important part in the management of chronic diseases.

In Indonesia, the prevalence of chronic diseases has continued to increase in recent years. Riskesdas show a significant increase in cases of hypertension and diabetes in the adult population. This increase in prevalence implies an increase in the number of individuals at risk of developing psychological disorders. The condition reinforces the urgency of interventions that focus not only on medical therapy, but also on mental support. Research on telecare in Indonesia still focuses more on aspects of patient satisfaction and service efficiency. Studies on its impact on the stress of chronic disease patients are limited. These limitations indicate the need for contextual research at the regional level. Bogor city is a relevant location given the high number of cases of chronic diseases (Ministry of Health, 2022).

Bogor city as one of the urban areas in West Java is also facing an increasing trend of chronic diseases. West Java's health profile notes an increase in chronic patient visits in first-rate health facilities. This surge in cases has the potential to increase the burden on health services. In addition, patients often face limited time and access to routine controls (West Java Health Office, 2023).

Limited access to face-to-face health services is a challenge. The transformation of the health care system encourages the use of digital technology to support continuity of care (Kemenkes RI, 2021). This change opens up the possibility of implementing remote health services. One such innovation is telecare.

Telecare is a health monitoring and consultation service based on communication technology that allows interaction between health workers and patients without direct meetings (WHO, 2021). This Model is considered effective in improving therapy adherence and quality of life of chronic patients. In addition, telecare provides psychosocial support on an ongoing basis. Thus, telecare has the potential to be a solution to the limitations of conventional services.

Several studies have shown that telecare can improve clinical outcomes in chronic disease patients. Study by Smith et al. (2022) reported an improvement in blood pressure control in hypertensive patients who received telecare intervention for 12 weeks. The results suggest that

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remote monitoring can improve treatment adherence. However, the psychological aspect has not been the main focus of the study.

Another study by Lee and Kim (2021) found that telehealth interventions can significantly lower anxiety levels in Type 2 diabetes patients. However, the specific measurement of stress has not been extensively explored in the context of telecare. This suggests a gap in research related to the impact of telecare on stress. Therefore, further studies are needed to enrich the scientific evidence.

Previous research has shown that telecare has the potential to improve clinical outcomes in patients with chronic diseases. Smith et al. (2022) reported that a 12-week telecare intervention was able to improve blood pressure control in hypertensive patients through remote monitoring encouraging adherence to treatment. In addition, Lee and Kim (2021) found that the use of telehealth can significantly reduce anxiety levels in patients with Type 2 diabetes. These findings suggest that the use of remote health technology not only contributes to the improvement of clinical conditions, but also has the potential to have a positive impact on the psychological aspects of patients.

Despite this, most research still focuses on clinical outcomes and anxiety, while aspects of stress in patients with chronic diseases have not been studied specifically in the context of telecare. Measurements and analyses on how telecare interventions might affect patients ' stress levels are limited. Therefore, a study titled The effectiveness of Telecare on stress reduction in patients with chronic diseases is important to explore in more depth the role of telecare in helping to reduce stress levels in chronic disease patients and enrich scientific evidence on the psychological benefits of such interventions.

Poorly managed stress can have an impact on reduced therapy adherence and the patient's quality of life. This condition can increase the risk of complications and rehospitalization. The continued impact of increased health costs is an additional burden on patients and the health system. Therefore, effective and efficient interventions are needed (Taylor, 2020).

In the context of primary health care, promotive and preventive approaches are a priority. Telecare has the potential to strengthen this approach through regular education and ongoing monitoring. This support allows early detection of psychological problems in chronic patients. Thus, telecare can serve as an integrative strategy in primary services (Greenhalgh, 2020).

The Perceived Stress Scale (PSS) is widely used to measure stress levels in clinical populations. The validity and reliability of this instrument has been tested in various international studies (Cohen, 2021). The use of standardized measuring instruments is important to ensure the accuracy of intervention evaluation. Therefore, stress measurement in telecare research needs to use standardized instruments.

Telecare implementation in Indonesia still faces various challenges, especially related to the digital literacy of the community and the limitations of technology-based healthcare infrastructure. Nevertheless, the increasing penetration of smartphone use in society provides great opportunities for the development of telecare services. This condition shows that the community begins to have a readiness to receive technology-based health services, especially if supported by adequate policies

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and service systems. Therefore, this study not only looked at the benefits of telecare in terms of clinical outcomes, but specifically focused on the effectiveness of telecare in reducing stress levels in patients with chronic diseases, which has rarely been the main focus of research.

In addition, this study also has the novelty of applying telecare interventions in the local context of Indonesia as well as evaluating the application of structured telecare in primary health care settings. This is important given the social and cultural characteristics of Indonesian society can affect the acceptance and effectiveness of health technology-based interventions. On the other hand, the dynamic characteristics of urban communities also have the potential to increase the risk of stress, especially due to the high demands of work and mobility, which often worsen the psychological condition of patients with chronic diseases (Sari, 2021). Thus, this study is expected to make a new contribution in understanding the role of telecare in reducing stress in chronic disease patients in the context of Indonesian health services.A technology-based approach allows for more flexible communication between patients and healthcare workers. More intensive interactions can increase the sense of social support (Brown, 2020). Social support is known to play a role in lowering stress levels in chronic patients. Thus, telecare has the potential to provide a double benefit.

Although various international studies show positive results, the effectiveness of telecare is strongly influenced by the local context. Cultural factors, technology access and health systems influence successful implementation (WHO, 2022). Therefore, empirical evaluation at the local level is important. Region-based research can provide more operational recommendations.

Bogor city has adequate primary health facilities, but the burden of chronic patient visits continues to increase. This condition can reduce consultation time and attention to psychological aspects. Telecare can be a strategy to reduce the density of face-to-face services. Structured and scheduled telecare interventions have the potential to assist patients in managing stress through education, brief counseling, and regular monitoring. This approach is in line with the chronic care model, which emphasizes active collaboration between patients and health workers (Wagner, 2021).

Based on the description, there is an urgent need to evaluate the effectiveness of telecare to reduce stress in chronic disease patients in Bogor. This research is important to provide locally based scientific evidence that can support policy making. In addition, the results of the study are expected to provide operational recommendations for primary health facilities. The interest of researchers arises from the high psychological burden of chronic patients as well as the potential of telecare as an innovative solution that has not been widely evaluated in the regional context.

METHODS

This study used a quasi-experimental design with a pretest–posttest control group approach to evaluate the effectiveness of telecare in reducing stress levels among patients with chronic diseases. The study population was patients with chronic diseases (diabetes mellitus, hypertension, and heart disease). A sample of 60 respondents were selected using purposive sampling technique in accordance with the inclusion criteria that have been set. Respondents were then divided into two groups through a random assignment process to minimize bias, namely 30 respondents in the

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intervention group who received telecare for 8 weeks and 30 respondents in the control group who received standard care. Inclusion criteria include patients aged 30-65 years, diagnosed with chronic diseases for at least 6 months, able to communicate well, have a smartphone, and are willing to participate in the study. The exclusion criteria include patients with cognitive impairment, severe psychiatric disorders, or acute conditions requiring intensive care.

This study was signed ethical approval by all respondents before data collection. The research procedure begins with screening and determination of the group, then pretest to measure the initial stress level in both groups. The intervention group received telecare services in the form of Health Education, condition monitoring, and brief counseling conducted through online communication media using WhatsApp Video calls on a scheduled basis once a week for 8 weeks. Each telecare session lasts 15-20 minutes and is provided by nurses who have received training related to education and monitoring of chronic disease patients. During the session, nurses provide health education, monitor the patient's condition, and provide brief counseling related to stress management and patient health conditions. Meanwhile, the control group received routine services according to applicable standards in health facilities without telecare intervention. After the intervention period was over, a posttest was conducted to assess changes in stress levels in both groups. Stress levels are measured using the Perceived Stress Scale (PSS-10), which consists of 10 items on a Likert scale of 0-4, so the total score ranges from 0-40; the higher the score indicates the higher the stress level. The validity and reliability of the instrument have been tested previously with Cronbach's alpha value >0.70. The Data were analyzed using paired t-tests to look at changes in stress scores within each group and independent t-tests to compare the difference in average stress reduction between groups, with a significance level of 0.05.

RESULTS

1. Average Stress Levels Before and After the Intervention

Table 1. Average Stress Levels Before and After the Intervention

Groups	N	Pretest Score (Mean ± SD)	Posttest Score (Mean ± SD)	Changes (Δ)	Cohen's d	p (paired t-test)
Intervention	30	24.6 ± 4.2	16.8 ± 3.9	-7.8	1.93	<0,001
Control	30	23.9 ± 4,.5	22.7 ± 4.3	-1.2		0,087

The intervention group receiving telecare had a mean stress score reduction of 7.8 points, indicating a significant reduction in stress ($p<0.001$). In contrast, the control group experienced only an insignificant decrease of 1.2 points ($p=0.087$). This shows that telecare is effective in lowering the stress level of chronic disease patients compared to standard care.

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2. Comparison of Changes in Stress Scores Between Groups

Table 2. Comparison of Changes in Stress Scores Between Groups

Groups	N	Δ Skor (Mean ± SD)	p (paired t-test)
Intervention	30	7,8 ± 2,1	<0,001
Control	30	1,2 ± 1,5	

The difference in the mean change in stress scores between the intervention and control groups was 6.6 points ($p<0.001$), indicating that telecare was significantly more effective than standard care in reducing patient stress. A relatively small standard deviation signifies consistent change among intervention group respondents.

DISCUSSION

1. Average Stress Levels Before and After the Intervention

The results showed that telecare intervention had a positive impact on reducing stress levels in chronic disease patients. These findings suggest that a technology-based healthcare approach can be an effective strategy in supporting the psychological well-being of patients. Telecare allows patients to receive ongoing health support without distance and time limitations, so that interaction with health workers is maintained consistently.

The reduction in stress levels in the intervention group can be explained by improved access to health education and regular monitoring of the condition. Education provided during the intervention helps patients understand the disease condition, the treatment process, as well as steps that can be taken to control symptoms. A better understanding of health conditions can reduce the uncertainty that is often a source of stress in chronic disease patients.

In addition, regular communication between patients and health workers provides an opportunity for patients to discuss health problems they are experiencing. This interaction serves not only as a means of conveying information, but also as a form of emotional support. When patients feel listened to and cared for by health workers, they tend to have a higher sense of security in the face of their disease condition.

The flexibility of telecare services also plays a role in improving patient comfort during the treatment process. Patients do not need to come directly to a health facility for education or a short consultation. This ease of access can reduce the psychological burden associated with limited mobility, time, and cost, thus indirectly helping to reduce stress levels.

The findings of this study are in line with research conducted by Lee et al. (2021) who reported that online health monitoring in patients with Type 2 diabetes can significantly reduce anxiety. Such interventions help patients obtain health information on an ongoing basis and improve their ability to manage the disease. Another study by Smith et al. (2022) also showed that telecare in hypertensive patients can improve adherence to therapy while reducing anxiety related to disease conditions. Remote health support allows patients to receive more consistent guidance on treatment and lifestyle changes.

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In addition, Cohen et al. (2021) emphasize that digital interaction with health workers can increase the social support Felt by patients. This social support is an important factor in helping patients deal with the psychological stress caused by chronic illness. Regular and responsive communication can promote a sense of security and strengthen the relationship between patients and health workers. The results of this study are also consistent with the findings of Greenhalgh (2020) which states that digital health services allow patients to stay connected with health workers despite limited access to face-to-face services. Such connectedness is important in the management of chronic disease because patients need ongoing monitoring and support.

In a local context, the Pratama study (2022) shows that the use of telehealth in hypertensive and diabetic patients can improve knowledge and adherence to treatment. Such increased knowledge helps patients understand the disease condition more comprehensively, so that they can manage their health with more confidence. Theoretically, the findings of this study can be explained through coping theory which states that stress can be reduced through effective anger management and problem solving strategies (Taylor, 2020). Telecare provides information and guidance that helps patients assess the health situation more rationally and determine appropriate treatment steps.

In addition to coping theory, social support theory also explains that the presence of emotional and informational support can help individuals deal with stressful situations. Continuous interaction with health workers via telecare provides an important form of social support for chronic disease patients. From the perspective of the chronic care model, telecare supports the creation of a collaborative relationship between patients and health workers. This Model emphasizes the importance of health education, continuous monitoring of the condition, as well as the active involvement of patients in the process of managing the disease (Wagner, 2021).

Overall, the findings of this study suggest that telecare is a potential approach in supporting the management of chronic diseases, not only from physical but also psychological aspects. The integration of Health Education, condition monitoring, and periodic brief Counseling provides comprehensive support for patients. Therefore, telecare can be considered as an effective intervention strategy to improve the quality of health services for chronic disease patients.

Researchers also analyzed limitations, such as an intervention duration of only 8 weeks and a relatively small sample. Longer-term studies with larger samples are needed to assess the sustainability of telecare effects and their impact on long-term clinical outcomes. Overall, research shows that telecare effectively lowers the stress of chronic disease patients through educational mechanisms, monitoring, and psychological support. These findings are consistent with theories of coping, social support, and self-efficacy, as well as supported by the latest literature. Telecare can be used as an operational and adaptive intervention strategy in primary health facilities.

2. Discussion of Comparison Between Groups

The results showed that the average difference in changes in stress scores between the intervention and control groups was 6.6 points ($p<0.001$). These findings confirm that telecare is more effective than standard care in lowering the stress of chronic disease patients. These significant

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differences indicate that telecare interventions provide a pronounced and consistent psychological effect on patients. This reinforces the basis for the use of telecare as a stress management strategy in chronic diseases.

Relatively small standard deviation values in the intervention group indicated that changes in stress scores were consistent among the majority of respondents. This consistency shows that telecare is not only beneficial for some patients, but provides tangible impact evenly. This effectiveness is an indicator that the intervention mechanism is working properly and reliably. This difference of 6.6 points practically indicates a considerable effect on the patient's quality of life. A significant reduction in stress can improve therapy adherence, reduce the risk of psychological complications, and strengthen patients ' motivation to undergo optimal management of chronic diseases. This confirms the importance of integrating psychosocial support into standard care.

These results are in line with the research of Lee et al. (2021), who reported that telehealth-based interventions in Type 2 diabetic patients resulted in significant reductions in anxiety and stress levels. The findings support that regular monitoring, education, and online counseling can effectively improve the psychological well-being of patients. This consistency reinforces the scientific evidence of telecare's effectiveness (Lee et al., 2021).

In addition, Cohen et al. (2021) emphasized that digital social support through telecare can lower stress and improve patients ' sense of control over chronic diseases. Regular interactions between patients and healthcare workers help patients feel more heard and cared for. This is relevant to the results of the current study, in which the stress scores of the intervention group decreased significantly compared to the control. (Cohen et al., 2021)

A more in-depth analysis showed that the greater decrease in stress scores in the intervention group was not only due to online interactions, but also to education that improved patients ' understanding of chronic diseases. This understanding helps patients manage symptoms and reduce anxiety related to the uncertainty of the disease. This intervention corresponds to the principle of self-efficacy in health psychology. [Bandura, 2020]

Coping theory can also explain the effectiveness of telecare. This intervention provides stress management strategies in the form of education and brief counseling, so that patients can deal with emotional distress and illness problems more effectively. Consistent decreases in stress scores support the practical application of coping theory in chronic disease management. The results of this study show clear operational implications for primary health care. Telecare can be integrated into routine programs for chronic patients, providing education, monitoring and psychological support on an ongoing basis. The effectiveness of this intervention makes telecare an efficient and adaptive alternative to face-to-face visits alone (Taylor, 2020).

The high consistency of change and small standard deviation indicate that the intervention can be applied evenly to the chronic disease patient population in urban areas such as Bogor City. This is relevant for patient management strategies that are difficult to access face-to-face services on a regular basis. Telecare offers flexibility while maintaining psychological effectiveness (Sari, 2021).

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Although the results showed significant differences, the researchers noted limitations in the duration of the intervention (8 weeks) and a relatively small sample size (<100). Longer-term studies with larger samples are needed to observe the sustainability of the effect and the impact on other clinical and psychological outcomes. This is important to strengthen the scientific evidence of telecare in the context of long-term primary, 2022).

According to the researchers ' analysis, the main mechanism for telecare's success is a combination of Health Education, regular monitoring, and counseling support. These three components work synergistically to lower stress and improve the patient's coping skills in the face of chronic illness. Education helps patients understand the disease condition and how it is managed, while regular monitoring allows health workers to identify changes in the patient's condition earlier. In addition, the counseling support provided periodically provides space for patients to express complaints as well as obtain emotional support, so that telecare not only serves as a digital intervention but also as a comprehensive psychosocial strategy.

In the context of primary health care, telecare can be implemented as part of a chronic disease patient monitoring program that is integrated with routine services in health centers or clinics. Health workers, especially nurses, can carry out telecare sessions on a scheduled basis using digital communication media that are easily accessible to patients, such as instant messaging applications, video calls, or cell phones. This approach allows the process of Education, Monitoring, and counseling to continue on an ongoing basis without having to always make direct visits to health facilities.

To support the implementation of telecare, some basic resources and infrastructure are needed, such as the availability of communication devices, adequate internet access, and training for health workers in providing online education and counseling. In addition, an organized system of recording and monitoring of patient data is needed so that the information obtained during telecare sessions can be well documented. With the support of adequate resources and policies, telecare has the potential to become an innovative strategy in nursing practice and public health policy to improve service quality and support more effective management of chronic disease patients at the primary health care level.

CONCLUSIONS

This study shows that telecare interventions are effective in lowering stress levels in chronic disease patients compared to standard care. Telecare programs that include health education, condition monitoring, and brief counseling provide ongoing support that helps patients understand their illness, improve coping skills, and improve psychological well-being. These findings suggest that a technology-based approach could be a useful strategy in supporting the management of chronic disease patients.

From a healthcare practice perspective, telecare has the potential to be an innovative approach that can be integrated in primary healthcare to improve the quality of monitoring and psychological support for chronic disease patients. The implementation of telecare allows health

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workers, especially nurses, to provide education and monitoring in a more flexible and sustainable manner, so as to expand access to health services for patients.

Despite this, the study had some limitations, including a relatively limited number of samples and a still short duration of intervention. In addition, the stress measurement uses only one instrument and therefore does not yet describe the psychological state as a whole. Therefore, further studies are suggested involving a larger sample, a longer period of intervention, as well as the use of more diverse psychological indicators to more comprehensively evaluate the effectiveness of telecare.

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