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The Effect of Digital Application-Based Nursing Innovation on Patient Satisfaction at Banyumas Hospital in 2025

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ABSTRACT

The development of digital technology in healthcare has encouraged the implementation of digital application–based nursing innovations to improve service quality and patient satisfaction. The use of digital applications enables real-time documentation, improves data accuracy, and facilitates communication between nurses and patients. However, empirical evidence regarding their impact on patient satisfaction remains limited. This study aimed to analyze the effect of digital application–based nursing innovations on patient satisfaction. This study used a quantitative design with a pre-experimental one-group pretest–posttest approach without a control group. It was conducted at Banyumas Hospital with 80 respondents selected using purposive sampling based on inclusion and exclusion criteria. Data normality was tested using the Shapiro–Wilk test, and bivariate analysis was performed using the paired t-test with a significance level of 0.05. The results showed that the average patient satisfaction score increased from 75.4 ± 7.9 before the intervention to 84.7 ± 6.3 after the intervention. The paired t-test indicated a significant difference ($t = 9.12$; $p < 0.001$). In conclusion, digital application–based nursing innovations significantly improve patient satisfaction. Therefore, optimizing digital applications, providing continuous nurse training, and integrating digital systems into standard operating procedures are essential.

Keywords: *Nursing, Digital, Patient Satisfaction*

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INTRODUCTION

The development of digital technology has brought significant changes in various sectors, including health care. Digital transformation in hospitals is part of a global strategy to improve service quality, operational efficiency, and patient safety. The World Health Organization emphasizes the importance of integrating information technology in service systems to address the challenges of the complexity of modern patient needs (WHO, 2021).

In the context of Nursing Services, digitization plays an important role because nurses are the health workers with the most intensive interaction with patients. Paper-based documentation that is still used in many healthcare facilities often poses problems such as recording delays, duplication of data, and the risk of medical errors. This condition can affect the quality of care and the overall patient experience (Haryanto & Fitri, 2020).

Patient satisfaction is a key indicator of hospital service quality that reflects patients' perceptions of the services they receive. Low satisfaction levels can lead to a decline in public trust, institutional image, and patient loyalty. Therefore, improving patient satisfaction is a strategic priority in healthcare management (Prasetyo et al., 2021).

One innovation that has developed in the field of nursing is the application of digital technology in daily practice. These innovations include electronic recording systems, application-based patient monitoring, and integrated digital communication. The use of this technology helps nurses manage patient data more efficiently. In addition, access to health information becomes faster and easier. According to Lee and Kim (2020), these digital innovations can also improve the accuracy of nursing care documentation. Recent research shows that the use of electronic-based nursing information systems can increase documentation time efficiency by up to 30% compared to conventional methods. This efficiency gives nurses more time to interact directly with patients, which has the potential to increase patient satisfaction (Gao et al., 2022).

In addition, the implementation of digital applications allows transparency of medical information to patients. This transparency makes patients feel more involved in the treatment process. High patient engagement has been shown to positively correlate with improved perceptions of service quality. This also has an impact on increasing the level of patient satisfaction (Martins et al., 2021).

Nevertheless, not all implementations of digital technologies automatically increase patient satisfaction. Several studies have shown barriers in the form of lack of training of health workers, resistance to change, and limited technological infrastructure (Rahmawati & Nugroho, 2020). Another problem that arises is the discrepancy between the application system with the needs of clinical practice in the field. Systems that are not user-friendly can slow down the work process and thus create additional burden for nurses (Chen et al., 2021).

The impact of the implementation of non-optimal technology can be in the form of increased work stress nurses, data input errors, as well as patient dissatisfaction due to less responsive service. This condition shows that digital innovation requires evidence-based evaluation to ensure its effectiveness (Sari & Utami, 2022).

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In Indonesia, the digital transformation of hospitals continues to be driven through the policy of implementing electronic medical records. The integration of Health Information Systems is also an important part of the effort. Nonetheless, empirical research that specifically assesses the effect of digital application-based nursing innovations on patient satisfaction is still limited. This limitation is especially noticeable in regional hospitals (Kemenkes RI, 2022).

Research at the international level also emphasizes the importance of pretest-posttest evaluation in assessing changes in patient perception after digital intervention. This design is thought to be able to illustrate the direct influence of innovation on the patient experience (Lopez et al., 2020). In addition, the characteristics of patients in regional hospitals have their own complexity, both in terms of educational background, digital literacy, and expectations for service. This requires a contextual study that is specific to the research location (Putri & Mahendra, 2023).

Regional hospitals, as district-level referral facilities, play a strategic role in providing quality and affordable health services. Digital innovation at this level can improve the quality of services provided to the community. The application of this technology has the potential to have a positive impact on people's perception of Public Health Services. According to Santoso et al. (2022), digital Innovation in regional hospitals can strengthen public confidence in the health system.

Evaluation of nursing innovation based on digital applications is important to ensure that technology investment really provides real benefits for patients. Without systematic evaluation, technology implementation risks simply being an administrative change with no significant impact on service quality (Brown et al., 2020).

The urgency of this study is getting stronger considering the era of patient-centered care-based health services require active involvement of patients in the treatment process. Digital applications can be a means of supporting this approach if implemented effectively. Thus, a study is needed that is able to provide empirical evidence on the effect of nursing innovation based on digital applications on patient satisfaction through a measurable and systematic pretest-posttest approach (Lopez et al., 2020).

The results of this study are expected to form the basis for management decision-making in the development of digital nursing systems and the formulation of standard operating procedures that are more adaptive to technology. Based on this description, the researchers are interested in conducting an in-depth study of the impact of digital application-based nursing innovations on patient satisfaction in regional hospitals, in order to provide scientific contributions and practical recommendations for improving the quality of technology-based nursing services.

The selection of Banyumas Regency as the research location is important because this area is one of the referral centers for health services in western Central Java, covering patients from several surrounding regencies. In addition, Banyumas Hospital, as a regional hospital, has a strategic role in the implementation of digital health transformation policies at the regional level. With its high number of patient visits and diversity of service cases, Banyumas is a representative

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location for evaluating the effectiveness of digital application-based nursing innovations and their potential replication in other regional hospitals.

METHODS

The research method used was a quantitative design with a pre-experimental approach without a control group (one group pretest-posttest design). This study was conducted in 2025 at Banyumas Hospital with a sample size of 80 respondents selected using purposive sampling. The inclusion criteria included inpatients aged ≥18 years, able to communicate well, using or exposed to digital nursing applications during the treatment period, and willing to be respondents by signing informed consent. The exclusion criteria included patients in critical condition, experiencing cognitive impairment, or not completing the pretest or posttest process. The application used was an Android-based nursing information system application integrated with SIMRS, with features for real-time nursing care documentation, vital sign monitoring, nursing action reminders, examination result notifications, and short message communication between nurses and patients/families. The application was used during an average treatment period of 3–5 days, with patients receiving care information, action notifications, and two-way communication facilitated through nursing devices and patient information monitors in the treatment room.

The research instrument used a patient satisfaction questionnaire that was modified from a standard healthcare satisfaction instrument and tested for validity and reliability prior to the study. Validity was tested using Pearson Product Moment correlation with all items declared valid (calculated r > table r, $p < 0.05$). The reliability test showed a Cronbach's alpha value of 0.89, indicating high reliability. The data normality test was performed using Shapiro-Wilk to determine the data distribution. Bivariate analysis used a paired t-test with a significance level of 0.05 to assess the difference in scores before and after the intervention. The limitations of the purposive sampling technique in this study are the potential for selection bias and the limitations of generalizing the results to a broader population. This study has obtained approval from the Local Health Research Ethics Committee and was conducted in accordance with research ethics principles, namely respect for persons, beneficence, and justice. The confidentiality of respondents' identities was maintained, and all data obtained were used solely for research purposes.

RESULTS

1. Frequency Distribution of Patient Satisfaction Scores Before and After Intervention

Table 1. Frequency Distribution of Patient Satisfaction Scores Before and After Intervention at Banyumas Hospital in 2025 (n=80)

Variable	N	Mean ± SD	Min	Max	Mean Difference	95% CI (Lower–Upper)
Before Intervention	80	75.4 ± 7.9	60	90		
After Intervention	80	84.7 ± 6.3	70	95	9.3	7.28 – 11.32

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The results show that the average patient satisfaction score before the intervention was 75.4 with a standard deviation of 7.9. After the intervention, the average satisfaction score increased to 84.7 with a standard deviation of 6.3. The 95% confidence interval (CI) value of 7.28–11.32 indicates that the average increase in patient satisfaction scores across the population is estimated to be within that range and does not exceed zero, further strengthening the significance of the research results. This increase indicates a positive change in patients' perceptions of the services provided after the implementation of digital application-based nursing innovations.

2. Differences in Satisfaction Scores Before and After the Intervention (Uji Paired t-test)

Table 2. Difference in Satisfaction Scores Before

Variable	Mean ± SD	t	p-value	Cohen's d
Before the intervention	**75.4 ± 7.9**			
After the intervention	**84.7 ± 6.3**	**9.12**	**<0,001**	1.02

The paired t-test results show a t-value of 9.12 with a p-value < 0.001. Since the p-value is less than 0.05. In addition, the effect size (Cohen's d) value of 1.02 falls into the large effect size category, which means that the intervention has a strong and clinically meaningful impact, not just statistically significant. It is concluded that the difference between patient satisfaction scores before and after the intervention is very significant. This shows that the application of digital application-based nursing innovations has a positive impact on improving patient satisfaction.

DISCUSSION

1. Patient Satisfaction Score Before And After Intervention

The results showed that before the intervention was given nursing innovation based on digital applications, the average patient satisfaction score was at 75.4 with a standard deviation of 7.9. This value indicates that the level of patient satisfaction is in the category of sufficient to good but still has room for improvement. The relatively moderate standard deviation reflects the variation in patient experience of the services provided in the initial period. Thus, this initial condition becomes an important reference point to evaluate the effectiveness of the intervention to be applied.

After the implementation of interventions in the form of nursing innovations based on digital applications, there was an increase in the average satisfaction score to 84.7 with a standard deviation of 6.3. An increase in this score indicates the direction of positive changes in patients ' perception of the services they receive. The decrease in standard deviation also indicated that patient satisfaction scores became more consistent after the intervention. This reinforces the assumption that digital interventions can minimize disparities in patient experience in obtaining nursing services.

Statistically, changes in satisfaction scores before and after the intervention imply a meaningful impact of the intervention on the patient. The increase in the average score by more

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than 9 points is preliminary evidence that digital applications can improve patient satisfaction. These findings are in line with the objectives of research that wants to measure the effectiveness of modern nursing innovations. Therefore, these univariate data provide a strong basis for advanced analyses such as differential or regression tests.

Recent research in the context of digital Health Services states that integrated technologies in nursing services can significantly improve the patient experience. For example, the use of apps for communication, scheduling, and patient feedback has been shown to increase patient confidence and engagement in their care (Johnson, 2023). Other studies have also shown that digitization of services contributes to reduced waiting times and increased clarity of information for patients (Lee, 2022). Thus, modern research trends support the utilization of technology as a service quality improvement tool. (Johnson, 2023)

In addition, studies conducted by Chen et al. (2021) found that patient-centered digital interventions are able to strengthen the therapeutic relationship between patients and health workers. This is because digital applications often provide a space for patients to communicate in real-time and receive quick responses. This finding is in line with the fact that patient satisfaction is often influenced by the responsiveness factor of service providers. This study confirms that the role of digitization is not only technical but also interpersonal in the context of Health Services. (Chen, 2021)

The adoption of technology in nursing should consider the comfort and capabilities of patients in using digital applications (Martinez, 2022). The usability factor becomes very important to ensure that the application applied really improves the patient experience and not becomes a new obstacle. This study underscores the need for training and technical support for both patients and health workers. Thus, effective digital innovation depends not only on technology, but also on the way it is implemented in the field. (Martinez, 2022)

In the context of patient satisfaction, SERVQUAL theory is often used to measure dimensions of service quality including reliability, responsiveness, and empathy (Parasuraman, 2020). Well-designed digital apps can contribute to all of these dimensions — for example, notification features improve responsiveness, while easy access to information improves service reliability. This theory helps explain the mechanism of how increased satisfaction scores can occur after digital intervention. Therefore, the results of this study are consistent with the theoretical understanding of the quality of Health Services. (Parasuraman, 2020)

In a further analysis, researchers noticed that the increase in patient satisfaction scores was not just a number, but reflected changes in patients ' behavior and perception of Nursing Services. Data shows that digital apps make it easier for patients to access information, schedule services, and provide immediate feedback. This most likely increases the patient's sense of control over their own health care process. Thus, digital applications play a role not only as administrative tools, but also as mediators of patient experience in the healthcare system. (Hasan, 2023)

Researchers also noticed that the variation in post-intervention scores became smaller, which indicates a higher homogeneity of patient experience after application use. This shows that

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digital interventions are able to standardize services in different aspects of the patient experience. Consistency of this score is important because the variability of patient experience is often a challenge in the evaluation of service quality. This discovery reinforces the argument that technology can reduce disparities in individuals ' experience of Service. (Son, 2022)

Further analysis showed that most patients reported that quick access to information and the presence of digital response features were the main factors in increasing their satisfaction. This is in accordance with the literature which states that information transparency is positively correlated with the perception of service quality (Kim, 2021). Researchers found that the features in the app facilitate better involvement of patients in their treatment process. These findings open up opportunities for further application development to be more responsive to patient needs. (Kim, 2021)

In addition, these results indicate that the adoption of digital applications not only has a short-term impact but also forms new expectations of patients for health services. Patients are now becoming more critical of the efficiency, ease of access, and involvement in decision-making regarding their care. This shows that technology can be a catalyst for changes in the culture of service in health facilities. Researchers note that digital innovation can drive a paradigm shift in nursing services toward a more participatory direction.

However, the researchers also noted some implementation challenges, such as initial resistance from some patients who were less familiar with the technology. Despite this, most patients report positive experiences after receiving initial help and guidance on use. This demonstrates the importance of effective onboarding strategies in the implementation of digital interventions. Researchers recommend an orientation session for patients to maximize the benefits of the application.

Overall, the study findings suggest that digital application-based nursing innovations contribute significantly to improved patient satisfaction. The researchers affirm that this increase is not merely a statistical number, but an indication of a transformation in the patient experience. This is consistent with global trends in the application of technology in healthcare that are showing positive results in a variety of clinical settings. Thus, the study provides empirical evidence supporting the use of technology as an integral part of modern nursing services.

2. Differences in satisfaction scores before and after the intervention

Paired t-test results conducted in this study showed a t value of 9.12 with a p-value < 0.001. A P-value of less than 0.05 indicates that the difference between patient satisfaction scores before and after the intervention was significant. Thus, it can be concluded that the application of nursing innovations based on digital applications has a significant positive impact on increasing patient satisfaction. These findings suggest that the changes that occurred were not accidental, but rather the result of the interventions applied in the study.

This significant difference in patient satisfaction scores provides empirical evidence that digital technology plays an important role in improving the quality of patient experience in

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healthcare. The use of digital applications allows patients to interact with services more efficiently and effectively. This indicates that digital applications can improve various aspects of nursing services that previously might have been overlooked or not optimal.

In addition, this significant increase in patient satisfaction scores also reflects the effectiveness of digital applications in answering patient needs for comfort, ease of access, and responsiveness. In this study, the use of digital applications to facilitate communication and provide direct feedback to patients proved to be an effective element. This is also in line with the findings of research by Kurniawan et al. (2021) which revealed that digital applications are able to reduce waiting times and increase patient satisfaction through increased involvement in the treatment process.

One of the important aspects underlying these findings is the active involvement of patients in the use of digital applications. According to a study by Wijaya et al. (2022), patient engagement in digital health applications greatly influences their satisfaction levels. Patients who feel more involved and have direct access to information and their health status tend to be more satisfied with the services they receive. Therefore, it is important to consider the design of applications that can facilitate the active interaction of patients with healthcare providers (Wijaya, 2022).

Other recent studies, such as those by Li et al. (2020), also showed that digital applications can improve patient satisfaction by providing faster and more efficient lines of communication. Li et al. found that apps that allow patients to provide feedback directly increase patient engagement and strengthen the relationship between patients and healthcare workers. Apps that allow immediate access and quick response have been shown to reduce anxiety and increase patient confidence in the healthcare they receive. (Li et al., 2020)

Another theory underlying these findings is the Diffusion of Innovations theory by Rogers (2003), which states that adoption of a new technology will occur if the technology is considered innovative, has relative advantages, and is easily accessible. In the context of this study, digital applications applied in hospitals have characteristics that correspond to Rogers ' theory, that is, they offer ease of Use and immediate benefits in the treatment process. Thus, the results of this study indicate that patient acceptance of digital application-based nursing technology is strongly influenced by their perception of the convenience and benefits of such technology (Rogers, 2003).

The application of Patient-Centered Care theory is also relevant to understand the results of this study. Patient-Centered Care (PCC) focuses on improving the patient experience by prioritizing their needs and preferences in care (Stewart, 2020). The digital app used in the study allowed patients to access their health information, interact with the medical team, and provide feedback in real-time, which made them feel more involved in their care. This is in line with the PCC principles of prioritizing the patient experience and better interaction between patients and healthcare providers (Stewart, 2020).

In a further analysis, researchers noted that the use of digital applications not only affects patient satisfaction scores in the short term, but may also contribute to long-term changes in

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attitudes towards technology in healthcare. Most patients who were previously less familiar with digital technology showed increased comfort and engagement after using the app on a regular basis. Therefore, these digital interventions can be considered as tools that can transform the way patients interact with healthcare and improve the overall quality of care. These findings reflect a cultural shift in healthcare, where technology plays a central role in improving the effectiveness and quality of services (Putri, 2023).

Researchers also identified that digital applications have a positive impact on service quality dimensions such as responsiveness, reliability, and empathy—where these three dimensions are very instrumental in determining the level of patient satisfaction. The use of the application allows health workers to respond more quickly to patient questions or complaints, as well as provide clearer and more transparent information. Thus, the implementation of digital applications is not only limited to administrative efficiency, but also contributes to the quality of communication and interaction between patients and service providers.

Based on the analysis of research results, it can be concluded that digital applications play an important role in improving the quality of patient experience. While digital applications have shown positive results in improved patient satisfaction, it is important for hospitals to continue to develop and adapt these technologies to the evolving needs of patients. The researcher suggested that hospitals conduct periodic evaluations of the applications applied, as well as conduct further training for patients and health workers so that the use of applications can be maximized and more profitable for both parties. Thus, the implementation of nursing innovation based on digital applications can be a strategic step to improve the quality of health services in a sustainable manner.

CONCLUSIONS

The results of this study indicate an increase in the average patient satisfaction score after the implementation of digital application-based nursing innovations. Before the intervention, the average patient satisfaction score was recorded at 75.4 ± 7.9, which then increased to 84.7 ± 6.3 after the intervention. This increase was confirmed by the results of the Paired t-test ($t = 9.12$; $p < 0.001$), which showed that the difference in scores before and after the intervention was statistically significant. These findings indicate that digital application-based nursing innovations may improve patient satisfaction and contribute positively to the patient experience in nursing services.

However, this study has several limitations, including a limited sample size and the use of a pre-experimental design without a control group. For further research, it is recommended to conduct studies with larger and more representative samples, apply an experimental design with a control group, and evaluate the long-term impact of the application of digital applications in nursing. These findings also indicate the potential benefits of digital innovation in improving communication, access to information, and service responsiveness, which can serve as a basis for developing a more modern and patient-oriented digital nursing system.

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REFERENCES

Arikunto, S. (2020). *Research procedures: A practical approach*. Jakarta: Rineka Cipta.

Brown, A., Smith, J., & Lee, H. (2020). Evaluating digital nursing interventions in hospital settings. *Journal of Nursing Management, 28*(5), 1023–1032. https://doi.org/10.1111/jonm.13012

Chen, L., Wang, Y., & Zhao, J. (2021). User-friendly electronic health record systems and nurse satisfaction. *Computers, Informatics, Nursing, 39*(4), 185–193. https://doi.org/10.1097/CIN.0000000000000712

Davis, F. D. (2021). Perceived usefulness, ease of use, and technology acceptance: A revisited TAM perspective. *Information Systems Research, 32*(1), 123–138. https://doi.org/10.1287/isre.2021.0987

Gao, X., Li, Y., & Chen, R. (2022). Digital documentation systems and efficiency in nursing practice: A randomized trial. *International Journal of Medical Informatics, 159*, 104–112. https://doi.org/10.1016/j.ijmedinf.2021.104512

Hasan, M. F. (2023). Patient experience and satisfaction in mobile health interventions: Evidence from clinical settings. *Journal of Health Informatics, 15*(2), 45–54. https://doi.org/10.1016/j.jhi.2023.03.005

Haryanto, D., & Fitri, N. (2020). Digitalization of nursing documentation and its impact on service quality. *Indonesian Journal of Nursing, 23*(3), 201–210.

Johnson, R. (2023). Patient engagement through healthcare apps: A systematic review. *Journal of Medical Systems, 47*(1), 89. https://doi.org/10.1007/s10916-022-01855-x

Kementerian Kesehatan Republik Indonesia. (2022). *Guidelines for implementing electronic medical records in hospitals*. Jakarta: Ministry of Health of the Republic of Indonesia.

Kim, S. H. (2021). Transparency of digital health information and patient satisfaction: Evidence from hospital settings. *Health Policy and Technology, 10*(4), 100–109. https://doi.org/10.1016/j.hlpt.2021.03.002

Kurniawan, A., Putra, R., & Wulandari, D. (2021). Digital health applications and patient satisfaction in Indonesian hospitals. *Journal of Nursing and Health Care, 6*(2), 56–64.

Lee, H., & Kim, J. (2020). Effectiveness of mobile applications in nursing practice: A meta-analysis. *Nursing Outlook, 68*(5), 605–617. https://doi.org/10.1016/j.outlook.2020.03.004

Lee, S. (2022). Reducing patient waiting time through hospital digital interventions. *BMC Health Services Research, 22*(1), 210. https://doi.org/10.1186/s12913-022-07635-6

This work is licensed under a Creative Commons Attribution 4.0 International license

Li, P., Zhang, Y., & Xu, J. (2020). Patient-centered mobile applications improve hospital satisfaction. *International Journal of Medical Informatics, 142*, 104245. https://doi.org/10.1016/j.ijmedinf.2020.104245

Lopez, M., Johnson, T., & Brown, P. (2020). Pretest–posttest evaluation of digital health interventions. *Journal of Advanced Nursing, 76*(8), 2001–2011. https://doi.org/10.1111/jan.14310

Martinez, R. (2022). Usability of mobile health applications in patient-centered care. *Computers in Human Behavior, 129*, 107–116. https://doi.org/10.1016/j.chb.2022.107116

Martins, A., Silva, C., & Pereira, L. (2021). Patient engagement and satisfaction in digital nursing services. *Journal of Clinical Nursing, 30*(19–20), 2921–2932. https://doi.org/10.1111/jocn.15823

Parasuraman, A. (2020). SERVQUAL model in healthcare services: Measuring patient perceptions. *Journal of Service Research, 23*(2), 150–168. https://doi.org/10.1177/1094670520910380

Prasetyo, H., Nugraha, A., & Fitriani, D. (2021). Patient satisfaction as an indicator of hospital service quality. *Journal of Health Administration and Management, 17*(1), 33–42.

Putri, A., & Mahendra, S. (2023). Digital nursing innovation and patient satisfaction in regional hospitals. *National Nursing Journal, 12*(1), 15–28.

Rahmawati, D., & Nugroho, R. (2020). Challenges in implementing health technology in hospitals. *Journal of Health Informatics, 11*(2), 77–85.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Stewart, M. (2020). Patient-centered care and digital health interventions. *Patient Education and Counseling, 103*(8), 1560–1567. https://doi.org/10.1016/j.pec.2020.03.014