The Effectiveness of Website-Based Telehealth E-Module in Increasing Dental Health Knowledge in Health Cadres

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Abstract:- The distance of the health center is one of the obstacles that causes some people not to visit the health center and the location of the health center far from people's homes is the cause of the lack of visits for patients for treatment or visits for consultation about their health. There is no dental health telepromotion module that can be used to make it easier for health cadres to provide dental health knowledge to the community, which is the main priority for the success of health services. The web-based E-Module is expected to be an information medium for cadres and the community in dental and oral health services. This research aims to produce a proper and effective dental and oral health E-Module in increasing cadre knowledge as well as an E-Module that will be used in disseminating information to the public. This research method uses Research and Development. The expert validation test for the E-Module obtained a p-value of 0.037 which shows that it is feasible as an E-Module in dental and oral health services. The test results on 30 Integrated Service Post (Posyandu) cadres showed that the p-value before and after the implementation of the E-Module in the aspect of pretest and posttest knowledge was $P < 0.041$. This shows that there is a difference in the value of pretest and post-test knowledge so that there is a difference in the effectiveness of the implementation of the E-Module on cadres.

Keywords:- E-Module, Knowledge, Integrated Service Post (Posyandu) Cadre, Dental Health.

I. INTRODUCTION

The National Health System explained that the goal of health development is the achievement of the ability to live a healthy life for every population in order to realize an optimal degree of health, as one of the elements of general welfare of the national goal. In the National Health System (SKN), the importance of resources that support these health efforts is stated [1]. These resources consist of health efforts, health financing, health human resources, pharmaceutical preparations, medical devices and food, health management and information, and science and technology.

The Covid-19 pandemic has shown how the health system in Indonesia still looks weak in overcoming health problems caused by the pandemic. Facts that show the weakness of our national health system are shown by prevention capabilities including testing, tracing, and tracking, the ability to handle a surge in cases in health services, mobilization of health resources such as health facilities, pharmaceuticals, and medical devices, health workers, and health financing [2]. The Covid-19 pandemic has also posed serious challenges to the public health service system.

The Government of Indonesia through the Indonesian Ministry of Health has taken steps to change by transforming the health. This step is taken so that in the future the health system in Indonesia is better prepared to face health crises caused by pandemics or natural/non-natural disasters. After the Covid-19 pandemic, challenges in the health sector in Indonesia have become more severe, especially challenges related to the implementation of adaptation to new habits, weakening economic conditions, epidemiological transitions, infrastructure, human resources and quality of health services, access to health services that are still uneven, to the ratio of health facilities and health workers that are not proportional to the population of Indonesia.

One of the health services affected by the Covid-19 pandemic is dental and oral health services. The pandemic situation has limited access to dental and oral health services, and the implementation of Community Activity Restrictions (PPKM) policies has made promotive and preventive efforts in the field of dental health decrease. Even though the prevalence of dental and oral health problems in Indonesia is still very high. Data from Riskesdas (2018) shows that 57.6% of Indonesia's population has dental and oral health problems, and only 10.2% of the population is served. Furthermore, only 2.8% of Indonesia's population is 3 years old and above with correct brushing behavior [3].

The high number of dental and oral diseases and the decline in promotive and preventive measures during the Covid-19 pandemic need to be a concern. The dynamics of Covid-19 cases to date, with the emergence of various new variants, provide a special lesson about the efforts that must be made to encourage the strengthening of promotive and preventive measures in the field of dental health [4]. In addition, to help reduce the number of dental diseases, it is necessary to develop the use of information and communication technology for dental health services as a means of promotion, education or consultation without meeting face-to-face.

Increasing promotive and preventive capacity is an important area in the transformation of the health system after the Covid-19 pandemic in Indonesia, where the key strategies needed are strengthening promotive and preventive efforts, as well as strengthening the digitalization of health services. Promotive and preventive strengthening is included in the first pillar in the transformation of the health system, namely the transformation of primary services, while the strengthening of digitalization of health services is included in the sixth pillar, namely the transformation of health technology that emphasizes the use of telemedicine, teledentistry and telehealth.

One of the technologies that is rapidly adopted in the health sector is telehealth technology which is widely developed by private innovators in the form of digital startup companies [5]. The Covid-19 pandemic has made the use of telehealth more widespread. The use of telehealth is related to the government's target of achieving Universal Health Coverage (UHC) of at least 95% of the total population or nationally as many as 257.5 million people by 2020 [6]. Telehealth technology is also a solution to the limited infrastructure and health human resources which is the cause of limited access to health services for the community.

During the COVID-19 pandemic, Indonesia's Ministry of Health urges people to avoid visiting hospitals, dental clinics and other health service offices, except in emergencies and to reduce the spread, Indonesia has made a policy to prevent transmission by using telehealth. Telehealth is an effective combination of telecommunications and dental science that has advantages during the COVID-19 pandemic, including being able to prescribe antibiotics to patients when they are experiencing emergency treatment, avoiding referrals to specialist doctors and following up with patients [7].

Based on the results of the study, the majority of respondents use Whatsapp as social media which is often used as a means of teledentistry communication, almost a third of dentists use social media for 2 to 4 hours (44.2%) with Whatsapp (98.8%) as the favorite social media used [8]. The media that has never been used for teledentistry by dentists in Aceh is Twitter, this finding is different from a study in Saudi Arabia where 64% of dentists use Twitter the most in dental practice (53.8%). Through social media, health practitioners can improve professional education, health promotion, patient care and education, and improve community health programs [9].

Dental and oral health services during the pandemic are a matter of concern because of the vulnerability of medical personnel and patients who are infected during dental care that produce aerosols, so a dental and oral health service module is needed that can reduce the transmission of Covid. Telehealth in the form of telepromotion is an alternative that is recommended in the midst and after the current pandemic, through telepromotion, patients can consult without having to meet face-to-face with a dental therapist or dentist and also plan for follow-up dental care. Telepromotion in the form of messages and applications can be a supportive tool to prevent and promote dental and oral health. The use of telepromotion as a promotional and preventive media is very effective in improving health services for the community, especially for those who live far from health service centers [7].

The implementation of telepromotion modules can be made in the form of formal education which is divided into two main categories, namely web-based education and education based on interactive video conferencing or other communication media. This means that this module can support dental health care efforts that are safe from the Covid-19 pandemic. On the other hand, the telepromotion module will support the transformation of health services, especially the first pillar, namely the transformation of primary services, and the sixth pillar, namely health transformation. This educational system in telepromotion contains learning materials about learning to grind teeth properly that have been developed and stored before users access the program. The advantage of web-based education is that users can control learning and can review as much material as possible according to the purpose. Meanwhile, the advantage of video conferencing-based education or communication media is that the community or patients can directly interact with health workers and can immediately receive feedback when there is something they want to ask [10].

The use of telepromotion as an educational medium for dental health services is very effective in delivering information or education about dental and oral health during the pandemic and post-pandemic. The effectiveness of this telepromotion can be said to be equivalent to promotion, education in the form of direct face-to-face consultation [11]. This is in accordance with a literature review that has been conducted previously which has stated that the use of telehealth can be ideal for the community, especially for people who do not have or have limited access to health services. This telepromotion method requires equipment and a good internet network connection [10]. This telepromotion application contains information about dental and oral health in the form of education for the public about the importance of maintaining dental and oral health (promotive). The dental health telepromotion module can also be used for teleconsultation programs that make it easier for people to check their teeth and mouth just by sending photos to dental therapists.

Integrated Service Post (Posyandu) cadres are partners of health workers who are on duty at Integrated Service Post (Posyandu) to provide services for the community. The capacity of Integrated Service Post (Posyandu) cadres is a top

priority for the success of health services, so it is important to equip Integrated Service Post (Posyandu) cadres with knowledge about health services that will be provided to the community. Based on the author's observation above, it is hereby stated that cadres lack the ability and knowledge of cadres about dental and oral health. This is because they have not been given training and equipped with knowledge about dental and oral health. Therefore, in addition to being given training, technology-based information systems need to be developed with the aim of being a medium that can help cadres in providing information to the public.

The journal related to this study is the Web-Based Dental Clinic Information System (Case Study: Lotus Dental Care) whose research results show that this system can provide information about the development of patient dental health to patients online. Thus it will help in providing up-to-date information to patients [12]. Similar research such as e-Clinic: Prototype of Dental Clinic Service System during the Covid 19 Pandemic with the results of the study showing that this e-clinic system which was built is expected to provide convenience for the community to get dental health services at the clinic with the implementation of well-maintained health protocols [13].

Other similar researches such as the design and construction of a website-based dental examination and care ordering information system based on the results of the analysis, design, and implementation, the system is feasible to use and can be used as a tool for dental care booking . The innovation that will be developed in this study is a web-based information system about the web-based dental and oral health E-Module [14].

The purpose of this study was to produce a feasible and effective oral health E-Module in an effort to increase the knowledge of cadres that will be used in disseminating information to the community.

II. RESEARCH METHODS AND SAMPLE

The method of research to be carried out is the *Research and Development* (R&D) method. Research and development procedures with R&D methods include information collection, product design, expert validation and revision, product trials and product results.

Information collection was carried out through the interview method with the head of the health center, gig doctors and dental and oral therapists. In addition, information was collected. Product Design/Module Data obtained from information collection is used in making the design of the Dental and Oral Health E-Module. Expert validation and revision Validation tests are carried out to test the feasibility of the product. The test is planned to be carried out by 2 experts, namely technology experts and dental and oral health service experts. The data collection technique is carried out by circulating questionnaires. The test was carried out with the aim of producing an E-Module in increasing the knowledge of cadres in providing dental and oral health services.

This Research Module trial uses a pre-experiment design with a one group pre-post test design. The sample in this study is Integrated Service Post (Posyandu) cadres using the *purposive sampling* technique, which is a technique for determining samples or respondents with certain considerations. The independent variable in this study is the website-based Dental and Oral Health E-Module, while the dependent variable is the knowledge of cadres, the researcher measures the knowledge of cadres before and after being given a web-based E-Module intervention. The result of this research is a website-based dental and oral health E-Module.

III. RESULTS AND DISCUSSION

A. Information Collection Stage
The information collection stage is carried out through interviews with the head of the health center, dentists and dental and oral therapists.

Table 1. Description of Informant's Answers to Questions in Information Collection

It	Question	Conclusion
1	How active are Integrated Service Post (Posyandu) cadres in improving dental and oral health at Integrated Service Post (Posyandu) so far	Integrated Service Post (Posyandu) cadres conduct Integrated Service Post (Posyandu) every month according to a predetermined schedule, but there are no Integrated Service Post (Posyandu) cadres who are trained in terms of dental and oral health services so that dental and oral health services have not been implemented at the Integrated Service Post (Posyandu)
2	What is the description of the number of service visits at the dental poly of UPTD Health Center in the past year?	The number of patient visits at the dental poly of UPTD Health Center within a year did not show a significant number compared to other polyclinics. About 500 visits within a year.
3	How do people get information about dental and oral health services at the Health Center?	Information about dental and oral health services is urgently needed by the public so there needs to be the right media and interesting modules so that it makes it easier for people to get information about dental and oral health anywhere and anytime.
4	What are the obstacles in disseminating information about dental and oral health services?	The delivery of dental and oral health information has several obstacles, including insufficient and inadequate budget allocation and lack of support from the government, and the capacity in the use of technology is still lacking.

5	What do you think about the E-Module or the module for delivering information about dental and oral health that should be applied?	The module for delivering information about dental and oral health that should be applied is technology-based such as creating a website that contains a menu of information about dental and oral health services that are commonly accessed by all levels of society using an Android cellphone.

After receiving information, the researcher identified problems so that several problems were found that often occurred such as the lack of people getting information about dental and oral health, the absence of space for consultation regarding dental and oral health, Integrated Service Post (Posyandu) cadres have never been trained in terms of dental and oral health services, the inactivity of the Village Community Dental Health Efforts (UKGMD) program so that dental and oral health services at the Integrated Service Post (Posyandu) are not optimal.

The module for delivering information about dental and oral health that should be applied is technology-based, such as creating a website that contains a menu of information about dental and oral health services that are commonly accessed by all levels of society using an Android cellphone. In today's digital age, where smartphones are ubiquitous, leveraging technology to disseminate health information can significantly enhance accessibility. A well-designed website can serve as a central hub for individuals seeking knowledge about dental hygiene, preventive care, treatment options, and local dental services, ensuring that essential information is available at their fingertips [15].

Furthermore, the website can be complemented by community outreach initiatives to engage users beyond the digital realm. Collaborating with local dental clinics and health organizations to host workshops or webinars can provide hands-on learning experiences. Social media integration can also help in spreading awareness and encouraging discussions about oral health topics. By fostering a community around dental health, the initiative can empower individuals to take charge of their oral hygiene, leading to improved health outcomes and a more informed public. This holistic approach not only promotes better dental practices but also strengthens the relationship between healthcare providers and the community.

B. Design and Build Models
The dental and oral health service model that has been running so far at the dental poly of the Health Center is carried out manually by coming for treatment through the service flow procedure. The system that runs manually causes many problems, including patients who seek treatment have to queue at the registration counter to be able to go to the dental poly for treatment and to get information about the dental health problems they are facing. So it is necessary to make efforts to improve dental and oral health services to get information about dental and oral health through a system. "E-Module of dental and oral health in the form of a web application system" that can be accessed by the entire community without having to come to the Dental Poly.

➢ *Input for the Preparation of the Dental and Oral Health E-Module in the form of a Website Application System.*
Preparation of dental and oral health E-Module in the form of a web application system using *the Rapid Application Development* (RAD) method with the following stages:
- The needs planning stage based on the results of previous information collection
- The RAD design workshop stage which includes the similarity of perception of website creation between *users* and *developers* as well as the creation of system diagrams
- The implementation stage of making a dental and oral health E-Module in the form of a web application system based on a previously made diagram design

➢ *The Process of Preparing the E-Module of Dental and Oral Health in the form of a Web Application System*
The preparation of the E-Module is carried out based on the results of information collection that has been developed through the developed system flow diagram. After being developed, the E-Module website is reviewed by researchers and the website is revised to the features in the website in accordance with the purpose of creation.

➢ *Output of E-Module of Dental and Oral Health in the form of a Web Application System*
The menu in the "Web-based Dental and Oral Health E-Module" system at the dental poly is designed with the following display:
- The display of the main page with the title "Arni Dental Clinic" in which there is a dashboard menu as a homepage serves to see the main topics on a website.
- Menu of information about dental and oral health On this menu we can get some interesting information about dental and oral health. And there is a menu to download what material you want.
- There is also a biographical menu of the author which is expected to be a source of information to the public.
- Menus for consultation are also provided to make it easier for people who want to ask questions about dental and oral health problems
- The activity documentation feature is found in the gallery menu which contains photos of activities that can be accessed to see the activities that have been carried out in terms of improving dental and oral health services.

C. Expert Validation
Expert validation is carried out on information technology experts and dental and oral health experts. Data analysis in this validation uses Interclass Correlation Coefficient (ICC)

Table 2. ICC Test Results

Position	Score	Average	Module	p-Value*	Category
Information Technology Expert	97.90%	97,34%	96,75%	0,037	Highly Worthy
Dentist	96,78%				

The table above shows the results of the feasibility assessment of the system from expert validators, it is known that the feasibility value is 97.34% with a very feasible category, the results of expert validity at the p-Value of 0.037 show that the E-Module "Arni Dental Clinic" is feasible as a web-based E-Module in the dental and oral health service system.

The module for delivering information about dental and oral health that should be applied is technology-based, such as creating a website that contains a menu of information about dental and oral health services that are commonly accessed by all levels of society using an Android cellphone. In the contemporary digital landscape, characterized by the pervasive use of smartphones, the strategic application of technology for the dissemination of health information has the potential to markedly improve accessibility [16]. Research indicates that mobile health (mHealth) interventions can bridge gaps in healthcare access, particularly in underserved populations, by providing timely and relevant information directly to users' devices. A well-designed website can serve as a central hub for individuals seeking knowledge about dental hygiene, preventive care, treatment options, and local dental services, ensuring that essential information is available at their fingertips [17].

D. Model Test Results

The E-Module trial "Arni Dental Clinic" uses the Pre-Experimental Design method with the design of One Group Pre-Post Test. This research was conducted on 30 cadres in the work area of the Health Center. The researcher collected information from respondents to find out the needs of dental and oral health services to build a web-based E-Module. The measurement of the effectiveness of the E-Module "Arni Dental Clinic" was carried out after the intervention, namely the implementation of the E-Module "Arni Dental Clinic" in the module of disseminating dental and oral health information.

This research was conducted on 30 Integrated Service Post (Posyandu) cadres. An overview of respondents is presented in the following table:

Table 3. Respondent Characteristics Data

Characteristic	Integrated Service Post (Posyandu) Cadre	
Education	N	%
SMA	15	50,00
D-III	10	33,00
D-IV/Bachelor's	5	16,00
Age		
20-29 years old	9	30,00
30-39 years old	16	53,00
40-50 years old	5	16,00

Based on the above, it is known that the majority of Integrated Service Post (Posyandu) cadre education sampled in this study is high school, namely 15 people (50.00%) and D-III as many as 10 people (33.00%) and D-IV/Bachelor 5 people (16.00%). Furthermore, based on their age, the majority of respondents in this study were 30-39 years old, namely 16 people (53.00%), 9 people (30.00%) aged 20-29 years and 5 people aged 40-50 years (16.00%).

The results of the descriptive analysis to determine the average value of knowledge are as follows:

Table 4 Average Value of Knowledge Aspects Before and After Training for Integrated Service Post (Posyandu) Cadres

Variable	Mean	Delta	SD
Pretest Knowledge	3.6667	4,23	1.44636
Postest Knowledge	7.9000		1.58332

Based on the table above, the descriptive results in the table above show that there is an increase in respondents' knowledge before and after cadre training from a score of 3.67 to 7.90.

The improved knowledge of health cadres after using e-modules can be explained through several important aspects that demonstrate the effectiveness of this technology-based learning method. The study showed that the use of e-modules in training health cadres can significantly improve their understanding of health issues [18], [19].

E-modules provide more flexible and interactive access for health cadres, allowing them to learn in a way that better suits their individual needs [20]. With features such as instructional videos, interactive quizzes, and materials that can be accessed at any time, cadres can learn at their own pace and repeat material that is difficult to understand. Research shows that this approach can improve information retention and practical skills, so cadres feel more confident in applying the knowledge they have learned in real contexts in the field.

Table 5. Results of the Paired Test of Knowledge Aspects Before and After the Implementation of the E-Module

Assessment Aspects	Statistics			
	Before	After	Delta (Δ)	P-Value
Knowledge				
a. Mean ± SD	3.667±1.446	7.900±1.583	4.23	0.041
b. Min-Max	1-7	4-10		

Based on the table above, it shows that the *p-value* before and after the implementation of the E-Module in the aspects of pretest and posttest knowledge is P<0.041. The result of the knowledge value before was 3.67 and after was 7.90. This shows that there is a difference in the value of pretest and post-test knowledge so that there is a difference in the effectiveness of the implementation of the E-Module in cadres.

The dental and oral health E-Module applied to the web-based Integrated Service Post (Posyandu) cadres was analyzed by pretest and post test data to assess the results of the implementation of the E-Module. This is done with the aim that the modules used can change the knowledge of cadres about dental and oral health [21].

Based on the results of the expert validation analysis, the feasibility assessment results were 97.34% with the category of very feasible, the results of the expert validity at the p-Value of 0.037 showed that the E-Module "Arni Dental Clinic" was feasible as a web-based E-Module in the dental and oral health service system.

Meanwhile, based on the results of the research carried out, the results of *the p-value* before and after the implementation of the E-Module in the aspect of pretest and posttest knowledge amounted to P<0.041. The *p-value* in the knowledge aspect before 3.60 and after is 7.90, this shows that there is a difference in the knowledge value of the pretest and the post-test so that there is a difference in the effectiveness of the implementation of the E-Module on cadres. This is in line with research which states that E-Module or teledentistry can be used as a dental and oral health service module whose application can change knowledge by conducting pretest and posttest [22]. In addition, the design and construction of a website-based dental examination and care ordering information system states that based on the results of its analysis, design, and implementation, the system is feasible to use and can be used as a tool for ordering dental care [12].

E. Model Results
The resulting product is one of the innovations to overcome the problems faced by health workers, especially Dental and Oral Therapists in providing information about dental and oral health to the community.

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IV. CONCLUSION

The E-Module "Arni Dental Clinic" is feasible and effective in increasing the knowledge of cadres in providing information about oral health services for the community. This e-module can be developed more broadly to cover all material about oral health and is easily understood by the community. It is hoped that the relevant health agencies will pay attention to the Community Dental Health Efforts (UKGM) program carried out at the integrated service post (posyandu) which is one of the priority programs of the health center which needs to be given financial support both for health workers and for ntegrated service post (posyandu) cadres.

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