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Effectiveness of TikTok Based Health Education in Improving Knowledge of Breast Cancer and Cervical Cancer among Women of Childbearing Age

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ABSTRACT

Background: There is a high incidence of breast cancer and cervical cancer globally and in Indonesia, especially in Central Java. This is due to a variety of factors, including socio-demographics, limited access to health information, and a lack of awareness of breast cancer and cervical cancer. Social media TikTok is used for health promotion in improving knowledge of breast cancer and cervical cancer among women of childbearing age. ***Purpose****:* This study aims to evaluate the effectiveness of health education delivered through TikTok in increasing knowledge about breast cancer and cervical cancer. ***Methods****:* In this pre-experimental study, 79 women of childbearing age were sampled to watch health videos through TikTok social media and were asked to fill out a questionnaire about knowledge about breast cancer and cervical cancer. ***Results:*** In 79 respondents, there was a difference in the average score before and after intervention on the knowledge of breast cancer and cervical cancer in women of childbearing age in the working area of Dayeuhluhur II Health Center with a value of p (0.00) <0.05. ***Conclusion:*** There is a relationship between the effectiveness of using a digital education method of TikTok and increasing knowledge about breast cancer and cervical cancer. ***Implications for Nursing*****:** Preventive and promotive efforts for the prevention of breast cancer and cervical cancer can be improved with health education. Health education about breast self-examination and visual inspection with acetic acid can be done through TikTok social media, as identified in this study. As discussed in this study, educational media must be further developed to increase knowledge to prevent breast cancer and cervical cancer.

Keywords: Social media, TikTok, Breast cancer, Cervical cancer, Women of childbearing age.

What does this paper add?

1. Cervical cancer prevention can reduce the death rate due to cervical cancer in teenagers and adult women through visual inspection with acetic acid as a method of early detection of cervical cancer. It involves examining the cervix for changes that might lead to cancer after applying acetic acid (ordinary table vinegar).
2. As a social media platform, TikTok is not only for entertainment, but can also be used as a health promotion medium to increase knowledge and understanding about breast cancer and cervical cancer in women of childbearing age.

Introduction

Based on global cancer observation data reports, a

project from the International Agency for Research on Cancer, the incidence of breast cancer will still be number two in the world at 2.296.840 cases. In comparison, the incidence of cervical cancer occupies the eighth order in the world at 662.301 cases. Asian women account for the highest number of breast cancer cases at 42.9%, while cervical cancer cases account for the highest percentage at 60% (Pradnyaswari et al., 2023).

Indonesia is a country in Asia. According to data from the WHO Cancer Country Profile 2020, data on the incidence of cancer in Indonesia in 2018, breast cancer is in the first place, with an incidence percentage of 16.7%. This is followed by cervical cancer in the second place, with an incidence percentage of 9.3% (Ferlay, 2022).

Data from the Central Java Health Service shows that the number of cervical cancer and breast cancer sufferers in Central Java shows an increasing trend. In 2021, people with breast cancer will reach 8.287 people, while in 2022, the number will reach 10.530 people. This number shows an increase of 27%. Meanwhile, the number of people with cervical cancer is 1.599 cases, and in 2022, it will be 2.440 cases, with an increase of 57.9%. The high number of cases is related to the low coverage of breast self-examination and visual inspection with acetic acid in Central Java province. Cilacap Regency is a district with low achievements. In 2023, there will only be a decrease of 3.9% from 2022; namely, 4.7% (Budi Susanto, 2024).

Women of childbearing age are women who have reached reproductive age and are physically able to conceive and give birth of children. These women are generally between the ages of 15 and 49 years. However, the upper limit of childbearing age may vary depending on each woman's individual factors (Kemenkes RI, 2016).

A tumour is a group of cells that develop in the body's tissues and go beyond normal limits. Tumours are divided into 2 types; namely, benign and malignant. Benign tumours can grow large, but their growth can generally be controlled and limited and do not metastasize. In contrast to benign tumours, malignant tumours can grow uncontrollably and metastasize to other tissues or organs of the body. Cancer is a malignant tumour. When cancer occurs on or around the mammary glands, it is classified as a breast cancer tumour, a group of cells that develop in the body's tissues and go beyond normal limits. Omran & Barakat, 2023).

Cervical cancer is a malignancy found in the cervix. The cervix is the lower third of the uterus, cylindrical in shape, protruding and connected to the vagina through the ostium uterine externa (Vera Novalia, 2023).

Breast cancer and cervical cancer have non-modifiable risk factors, including older age (>65 years), genetic predisposition (including DNA mutations and a family history of BC), early menarche (55 years), age at first pregnancy over 30 years, infertility and nulliparity, use of contraceptives, hormonal treatment after menopause, and no history of breastfeeding (Sun et al., 2017). Lifestyle factors, such as obesity, dietary choices, and the use of oral hormonal contraceptives, are modifiable risk factors for BC (Ajlouni et al., 2023).

Many risk factors can enable increased growth of breast cancer and cervical cancer, such as sex, ageing, estrogen, family history, gene mutations and unhealthy lifestyle (Ariati & Nikmah, 2021).

Literature Review

Quoting research by Ge'e et al. in 2021, there is still a lack of awareness among Indonesian women in carrying out early detection, because they do not know how to detect breast cancer and cervical cancer early. There is a relationship between the incidence of cervical cancer and a woman's level of knowledge; out of a total of 144 respondents, there were 61 respondents who had less knowledge, with a percentage suffering from cervical cancer of 42.4%. One of the efforts made to increase knowledge is health promotion activities. Health promotion can be provided in various ways, such as reading and listening to information from print and electronic media (Ge'e et al., 2021).

The low coverage of breast self-examination for breast cancer detection and visual inspection with acetic acid for cervical cancer detection is influenced by various factors. Factors include socio-demographics, socioeconomic status, history of the disease, and minimal awareness of the disease as a lack of information and knowledge about breast cancer and cervical cancer (Mirfauddin et al., 2023).

One of the popular electronic media today is the application TikTok; since 2018, it has been used to convey information that does not require high costs, does not require much energy, and can be completed in a short time (Dita Oktaviani et al., 2024).

According to research by Octaviani et al. in 2024 explaining the effectiveness of health promotion through TikTok social media, it was concluded that there was a difference in the attitude of the intervention group (TikTok) before and after the use of TikTok where the p-value was 0.000<0.05. The effectiveness of health promotion through TikTok has dramatically increased knowledge and facilitated health education for respondents (Octaviani et al., 2024).

Quoting research by Lasari & Amalia in 2021., it was revealed that generally, respondents who felt symptoms of breast cancer felt inferior about expressing the symptoms that they were experiencing. Social support communicated online can be more responsive and accessible than face-to-face support, can result in enhanced privacy and control, can eliminate communication barriers, and can reduce perceptions of reciprocal obligations associated with face-to-face support exchanges (Lasari & Amalia, 2021).

The high cases of breast cancer and cervical cancer in Indonesia, especially in the Cilacap district, are due to low knowledge about breast cancer and cervical cancer. Generally, patients who feel symptoms feel ashamed to express themselves and do not know how to perform early detection tests for breast cancer and cervical cancer.

It should be noted that there has been no previous research on the effectiveness of TikTok educational media on breast cancer and cervical cancer knowledge in Indonesia. The cases of breast cancer and cervical cancer in Indonesia are quite high, and TikTok is a trending social media among the public. Therefore, there is a need for health education as a preventive effort to increase the knowledge of women of childbearing age about the early detection of breast cancer and cervical cancer through the TikTok social network. This study was conducted to assess the average knowledge of women of childbearing age related to breast cancer and cervical cancer by evaluating the role of social media in the prevention of breast cancer and cervical cancer. The assessment is essential for planning public health programs aimed at preventing risk factors for breast cancer and cervical cancer among women.

Method

Study Design

This research uses a pre-experimental design. One group without a control group was asked to do a pre-test before being given treatment to measure the initial abilities of respondents before the intervention, and a post-test after intervention to measure final abilities. Next, the results were compared, so that the intervention results can be known. The instrument in this study was a questionnaire containing questions about breast cancer and cervical cancer, where validity and reliability tests had previously been carried out (Sri Rochani Mulyani, 2021).

Sample

This study's population is 962 women of childbearing age in Cilacap Regency, Indonesia. The study's sampling technique was convenience sampling. The size of the sample was determined based on Sidik's (2021) statement that 15 people is the minimum sample limit for pre-experimental research (Prof.Dr. H.M. Sidik Priadana, 2021). Of the 962 females of childbearing age, the researchers obtained 79 respondents who met the inclusion criteria.

Criteria for women of childbearing age (15-49 years):

1. Inclusion criteria
   a. Women of childbearing age who have had sexual intercourse.
   b. Women with TikTok account.
   c. Women with cooperative participation in activities from start to finish.
2. Exclusion criteria
   a. Virgin women.
   b. Pregnant women.
   c. Being not present at the counselling event.
   d. Having history of breast tumors.
   e. Suffering from breast tumors.
   f. Having cervical cancer.

Data Collection

The study took place from October 30 to November 30, 2024, and was conducted on 79 women of childbearing age in Cilacap, Indonesia. Before the intervention, respondents filled out a pre-test questionnaire about breast cancer and cervical cancer. Furthermore, the respondents were given an intervention to see videos on TikTok that the researchers about breast cancer and cervical cancer had provided. 5-minute videos were addressed of breast cancer and 4-minute of videos cervical cancer. The same intervention video will be watched by the respondents once a day, three times a

week (Mondays, Wednesdays, and Fridays). The researchers monitored the respondents every week to determine whether all respondents watched the full educational videos given through TikTok. After one month of intervention, the researchers will provide a post-test as an evaluation to measure knowledge about breast cancer and cervical cancer using a questionnaire administrated to the respondents.

Analysis

Validity and reliability were tested using SPPS software. The validity test uses the Pearson product-moment, which is declared valid if r counts > r table. The results of the validity test were obtained from the r count (0.792) > the r table (0.444), and then the questionnaire used by the researchers was declared valid. The reliability is assessed using Cronbach's alpha, which is declared reliable if alpha > 0.60. The reliability result on the questionnaire was (0.964)>0.60, so that the questionnaire used was declared reliable (Dedi, 2019).

The questionnaire used during the pre-test and post-test is the same, containing 30 questions, of which 15 questions are about breast cancer and 15 questions are about cervical cancer. The questionnaire has been tested for validity and reliability on 30 respondents outside the research sample. The identity component of the questionnaire consists of characteristics, such as age, education, and occupation.

The analysis will be carried out using SPSS. The univariate analysis method describes the characteristics of each variable, such as age, education, and knowledge, in the form of frequency and percentage distribution (Ni Putu Kusuma, 2022).

Bivariate analysis is a tool used to prove the research hypothesis between independent and dependent variables. The independent variable in this study was health education through social media TikTok, which was the cause of change. In contrast, the bound (dependent) variable was the average fertile age women's reproductive score for breast cancer and cervical cancer. The data will be analyzed using the Dependent T-Test to see the difference between the two, because the groups to which the data is compared have mutual dependencies. Data collection will be carried out twice, before and after the intervention action (same respondents) (Nur Fauziyah, 2018).

Ethical Considerations

This research has received ethical permission from Poltekkes Kemenkes Tasikmalaya, Indonesia No. DP.04.03/ F.XXVI.20/ 311/2024. The research explained to the respondents the benefits and losses caused, the human rights and *anonymity* of the respondents, privacy and confidentiality, as well as justice obtained by the respondents. Furthermore, those willing to be involved signed an agreement that was informed face-to-face directly.

Results

Sample Characteristics

Based on Table 1, it is known that the majority of respondents aged 20-25 years were 38 people (48.1%). The lowest respondent age group was 46-50 years, consisting of two people with a percentage of 2.6%. The majority of respondents' education was high school, with as many as 35 people, amounting to a percentage of 44.3%. The lowest level of education of respondents was elementary school, with 10 people and a percentage of 12.7%. The majority of the respondents were unemployed with 28 people (35.4%), The lowest occupation of the respondents was labourers, with eight people and a percentage of 10.1%.

Table 1. Frequency distribution and percentage of respondent characteristics (N=79)

No.	Character	Number	Percentage (%)
1	Respondents by age years		
	20-25	38	48.1 %
	26-30	27	35.4 %
	31-35	4	5 %
	36-40	4	5 %
	41-45	3	3.9 %
	46-50	2	2.6 %

2	Respondents based on education		
	Elementary school	10	12.7%
	Junior high school	12	15.2 %
	Senior high school	35	44.3 %
	Graduates	22	27.8 %
3	Respondents based on occupation		
	Unemployed	28	35.4 %
	Civil servant	24	30.4 %
	Farmer	19	24.1 %
	Labourer	8	10.1 %

Bivariate Analysis

Table 2 shows the average knowledge of women of childbearing age before the intervention; namely, 13.000, with an SD of 3.637; the average knowledge of women of childbearing age after the intervention was 19.632, with an SD of 3.645. These results show that the intervention increased knowledge by 6.632. The results of statistical tests concluded that there was a significant difference between the average knowledge before and after the intervention ($p = 0.00$; $\alpha = 0.05$).

Table 2. Average distribution of knowledge of women of childbearing age before and after the intervention (N=79)

CERDIK CERIA intervention	Paired Samples Test						
	Mean	SD	N	Mean Difference	T-value	P-value	N
Before	13.000	3.637	79			0.00	79
After	19.632	3.645	79				79
Pre-test- Post-test				6.632	-12.340		

Discussion

Characteristics of the respondents, such as age, education and occupation, influenced increasing knowledge of breast cancer and cervical cancer. The average knowledge score of women at childbearing age before the intervention was 13.000, and the average knowledge after the intervention was 19.632. These results show that the intervention increased knowledge by 6.632. The results of statistical tests concluded that there was a significant difference between the average knowledge before and after the intervention ($p = 0.00$; $\alpha = 0.05$). This is in line with research by Damayanti et al. (2023), showing that providing audiovisual media of cervical cancer animation increases interest in women of childbearing age in IVA examinations (p=0.007). The results were obtained based on the mean value before being given audio visual media (53.33), and after that (59.70); so there was an increase in interest of 6.37. Education *via* social media, especially TikTok, can provide information that is more interesting and easily accessible to young and productive age groups. Through a short video containing tutorials and information on the importance of BSE and IVA tests, participants will learn how to carry out tests correctly and understand the importance to early breast cancer and cervical cancer detection (Damayanti et al., 2023).

Increasing understanding of this early detection method depends on attractive application design and clear and relevant information delivery. This is in line with the research of Riani et al. (2023) that the average knowledge before being given treatment had a score of 45.81, the lowest knowledge score was 22.0, and the highest knowledge score was 63.0 with a standard deviation of 9.13. After being given the treatment, the average knowledge was 77.94, and the highest

Author Contributions

Study Design: **KAAA**. Data Collection: **MBS**, **ZA**, **YA**. Data Analysis: **AA**, **AM**, **OA**. Study Supervision: **AA**. Manuscript Writing: **MBS**, **AA**, **MA**, **AA**. Critical Revisions for Important Intellectual Content: **AA**, **MBS**, **MS**, **MA**.

knowledge score was 93.0, with a standard deviation of 6.17. This research also emphasizes the importance of mobile applications in increasing the accessibility of health services, especially in remote or limited areas, thereby expanding the coverage of cancer detection more evenly (Riani et al., 2023).

The results of this research are supported by Annisa Permatasari (2023) showing that mobile applications have significant potential to increase user awareness about the importance of routine examinations, such as BSE (Breast Self-examination) and Cek IVA (Acetic Acid Visual Inspection). Apart from that, mobile technology has also been proven to encourage proactive behaviours, such as reminding users to carry out routine checks and providing educational information that is easy to access and understand (Annisa Permatasari, 2023).

This allows wide and fast dissemination of health information. The main contribution of this research is to show that social media can be an effective tool in health promotion for adolescents, increasing health literacy, adherence to treatment, and participation in health decision-making (Wahyuni, 2022).

This research is also in line with previous research stating that the respondents' knowledge before being given health education was in the medium knowledge category; their knowledge increased to the high knowledge category after being given health education *via* social media. Respondents' behaviour before health education using online media was in the category of negative behaviour in the prevention of cancer (Sunarsih Sutaryo & Widyatama, 2011).

Implications for Nursing

By utilizing TikTok social media, education makes cancer prevention easier, more interesting and efficient, because it saves time, energy and costs to deliver health education to patients. Another benefit felt by health workers is that education about breast cancer and cervical cancer can be more effective, because everyone can see and download videos from TikTok. It also trains health workers, especially nurses and midwives, to be creative and innovative to adapt to the times. Knowledge of women of childbearing age about breast cancer and cervical cancer will be improved through early detection and reducing the incidence of breast cancer and cervical cancer.

Limitations

One limitation of this study is that not all women of childbearing age have adequate internet access. Some of them do not use TikTok (There are women of childbearing age who do not have a TikTok account), and the studies conducted are still face-to-face and have not used online surveys. Moreover, the sample obtained is still small, and there are still categories of women of childbearing age who have not been considered in the inclusion criteria, such as women who are pregnant.

Conclusion

Knowledge about breast cancer and cervical cancer in women of childbearing age can increase significantly if education is provided through more interactive media, such as educational videos on social media and TikTok. Education through social media, which is trending and popular now, especially TikTok, will be more interesting, because it is easily accessible and uploaded by young age groups and women of productive age. Through a short video containing tutorials and information on how to carry out your own breast examination and visual inspection using acetic acid, participants will learn how to perform the test correctly and understand the importance of early detection of breast cancer and cervical cancer.

Conflict of Interests

There is no conflict of interests to be declared by the researchers.

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