

## IDENTIFICATION OF CANCER AWARENESS AMONG ADULTS AFTER GIVEN CANCER EDUCATION APP (PEKA) IN JEMBER, INDONESIA

Oleh

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**Abstract:** *One of the main barriers to cancer prevention and early detection is the general lack of awareness of cancer risk factors, symptoms, and screening options. Improving long-term cancer outcomes requires increasing public knowledge through interesting strategies with mobile app called PEKA. This study aims to identify cancer awareness among adults by given education mobile-app. This study used a quantitative descriptive method with 75 respondents. Descriptive analysis of the data was utilized to compile awareness and demographic traits. The result shows mostly 39,7% was answer incorrectly about cancer warning sign, 52% doesn't know the screening programme, and the descriptive response displays a variety of responses. The results emphasize the benefits of multimodal, community-integrated teaching strategies, especially for individuals with poor computer literacy or educational achievement. PEKA and other mobile apps should be considered complementary tools rather than standalone solutions.*

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## INTRODUCTION

Low and middle-income nations are disproportionately affected by cancer, which continues to be one of the world's major causes of illness and mortality (World Health Organization, 2020). According to the Ministry of Health, the prevalence of cancer has steadily increased over the past ten years in Indonesia, making it a serious public health concern. According to Kementerian Kesehatan Republik Indonesia (2025), Indonesia currently records around 400.000 new cases of cancer each year, with the mortality rate reaching 240.000 cases per year. Low public knowledge of cancer risk factors, symptoms, and screening alternatives is one of the major obstacles to cancer prevention and early diagnosis (Kementerian Kesehatan RI, 2021). Raising public awareness through simple, engaging teaching methods is essential to improving long-term cancer outcomes.

In recent years, digital health technologies have emerged as powerful tools for disseminating health information and encouraging behavioral change. Specifically, mobile health (mHealth) applications offer a cost-effective and scalable means of reaching broad audiences with personalized educational content (Marcolino et al., 2018). As an instructional

tool, the PEKA cancer education app was developed to increase adult awareness of cancer. PEKA offers interactive, evidence-based information on cancer prevention, and early detection with the goal of empowering people to make informed health decisions by expert consultation feature.

The East Java region of Jember provides a unique backdrop for this study due to its diverse population and spectrum of health literacy. Previous local assessments have found gaps in cancer prevention knowledge and practices, especially among those aged 30 and above (Sari et al., 2022). Therefore, putting into practice a targeted intervention like PEKA could significantly improve early cancer help-seeking behaviors and public awareness. It is essential to evaluate the success of such efforts in order to direct future public health measures in similar circumstances.

After utilizing the PEKA educational program, the purpose of this study is to determine the degree of cancer awareness among adults in Jember. The study investigates in cancer-related knowledge after the intervention. It is anticipated that the results would shed light on the efficacy of mobile-based learning and its prospects for further adoption throughout Indonesia. This study is important because it adds to the expanding corpus of research on mHealth therapies for non-communicable diseases in underdeveloped nations. Additionally, it provides a template for community-based education initiatives that can be copied or modified for use in other areas with comparable health issues. In order to guarantee optimal impact and sustainability, the incorporation of digital tools into public health education must be supported by evidence.

## METHODS

This study used a quantitative descriptive method to identify the level of cancer awareness among adults after the implementation of the PEKA cancer education application in Jember, Indonesia. A pre-experimental one-group post-test design was applied. Participants were assessed after receiving cancer education through the PEKA application to evaluate their awareness levels. A purposive sampling technique was used to select 75 respondents who met the inclusion criteria: aged  $\geq 18$  years, able to use smartphones, willing to participate in the study, having connection with cancer by experience or others, or include as high risks group for cancer. The instrument used was Cancer Awareness Measure (CAM). The questionnaire was distributed via the PEKA application, and responses were recorded digitally. It consisted of multiple-choice questions that measured participant's knowledge, attitudes, and behaviors related to cancer awareness. Data were analyzed using SPSS software version 25. Descriptive statistics were used to summarize demographic characteristics and awareness. Ethical approval for the study was obtained from the Health Research Ethics Committee of Universitas Jember with number 2607/UN25.8/KEPK/DL/2024. All participants provided informed consent prior to participation, and confidentiality was maintained throughout the research process.

## RESULTS AND DISCUSSION

### Results

**Table 1. Socieodemographic characteristics**

<b>Sociodemographic characteristics (N=75)</b>		<b>n</b>	<b>%</b>
Gender	Female	64	85,3
	Male	11	14,7
Age	Young adults (17-30)	3	4
	Middle-age adults (30-35)	19	25,3
	Old-age adults (>31)	53	70,7
Level of Education	Not attending school	4	5,3
	Primary	27	36
	Intermediate	13	17,3
	High School	24	32
	Bachelor's degree	7	9,3
Employment status	Unemployment	6	8
	Housewife	40	53,3
	Farmer	15	20
	Employee	14	18,6
Length of illness	< 1 year	36	48
	1-2 years	26	34,7
	2-4 years	8	10,7
	>4 years	5	6,7
Frequency of chemotherapy	< 6 times	69	92
	> 6 times	6	8
Type of cancer	Breast cancer	60	80
	Colorectal cancer	7	9,3
	Nasopharing cancer	3	4
	Skin cancer	2	2,7
	Lung cancer	1	1,3
	Bladder cancer	1	1,3
	Lymp cancer	1	1,3
Who has been diagnosed with cancer?	Myself	44	58,7
	Husband or wife	3	4
	Parent	4	5,3
	Close relative	12	16
	Another relative	3	4
	Friend	9	12

**Table 2. Domain of Cancer Awareness Measure (CAM)**

<b>Cancer Awareness Measure (CAM) Results (N=75)</b>		
<b>Domain</b>	<b>Answer</b>	<b>%</b>
<b>Warning Sign</b>		
Q1- Open warning	Most of the answer were pain, lumps, chills,	

signs	fluid excess from the wound, short of breath, and bleeding	
Q2- warning signs knowledge	Correct answer	23,7
	Incorrect answer	39,7
	Don't know	36,6
<b>Delay in Seeking Medical Helps</b>		
Q3- Help Seeking	1-3 days	47,67
	4-6 days	4,50
	1 week	7,17
	2 weeks	1,17
	1 month	4,17
	6 weeks	0,67
	3 months	1,83
	6 months	1,00
	12 months	2,00
	Never	29,83
Q4- Seeking Help for Cancer Symptoms	1-3 days	48,0
	4-6 days	6,67
	1 week	10,67
	2 weeks	4,00
	1 month	6,67
	6 weeks	1,33
	3 months	0
	6 months	1,33
	12 months	2,67
	Never	18,67
Q5- Barrier to Seeking Medical Help		
Emotional	Often	27,67
	Sometimes	20,00
	Never	51,67
	Don't know	0,33
Practical	Often	8,0
	Sometimes	10,7
	Never	80,9
	Don't know	0,4
Service	Often	2,22
	Sometimes	9,78
	Never	85,33
	Don't know	2,67

<b>Risk Factors</b>		
Q6- Open Risk Factors	Most of the answer were diet, heredity, lifestyle, stress, and contraception	
Q7- Closed Risk Factors	Very Disagree	0,85
	Disagree	17,82
	Not Sure	42,55
	Agree	33,33
	Very Agree	5,33
<b>Incidence (Q8)</b>	<50 orang	65,3
	>50 orang	34,7
<b>Common Cancers (Q9)</b>	In woman	Ca mammae, cerviks, ovarium
	In man	Ca prostat, lung, lymphoma
<b>Screening Programme (Q10)</b>		
Knowledge	Yes	10,2
	No	52,0
	Not sure	37,8
Age of first invitation	Mostly doesn't know	
<b>Risk Factor Ranking (Q11)</b>	Lifestyle Genetic inheritance Environtmental factors Chance Aging	

## Discussion

Despite the educational intervention using the PEKA application, the study shows that the respondents have gaps in their knowledge of cancer. Only 23,7% of participants correctly identified cancer symptoms in the warning signs knowledge category; 39,7% gave an inaccurate response, and 36,6% said they "do not know." These findings imply that despite the digital delivery of information, there was little internalization of the material. This supports the Health Belief Model (HBM), which argues that behavioral change requires not only information but also a sense of vulnerability and the benefits of action (Champion et al., 2020). Participants lack of urgency in taking in and remembering information related to symptoms may be explained by their low perceived threat.

Regarding help-seeking behavior, a positive result was reported by 47.67% and 48.0% of respondents, who said they would seek medical assistance within 1-3 days of identifying symptoms. But a significant percentage—29.83% (Q3) and 18.67% (Q4)—said they would never ask for assistance, which is cause for grave concern. Emotional reactions like fear or denial can stifle logical health decisions, according to Leventhal's Common-Sense Model (Liu et al., 2021). The data on emotional barriers supports this, as 27.67% of respondents said

they "frequently" encountered emotional barriers, whereas practical (8%) and service-related (2.22%) difficulties had lower percentages. In this demographic, emotional concerns like hopelessness, stigma, or fear of diagnosis may be major deterrents.

A encouraging result was seen in the help-seeking behavior of 47.67% and 48.0% of respondents, who said they would seek medical assistance within 1–3 days of noticing symptoms. There are significant worries, though, as a significant percentage—29.83% (Q3) and 18.67% (Q4)—said they would never seek assistance. As per Leventhal's Common-Sense Model, logical decisions regarding health can be suppressed by emotional reactions like fear or denial (Liu et al., 2021). According to the statistics on emotional obstacles, 27.67% of respondents said they "frequently" encountered emotional barriers, while practical (8%) and service-related (2.22%) respondents reported less frequent emotional hurdles. Inhibitors in this demographic may be emotional, such as hopelessness, stigma, or fear of diagnosis. In barrier to seeking medical help, these findings suggest that emotional factors are the most prominent deterrents, far exceeding logistical or service issues. In other words, even when services are accessible, fear, shame, or anxiety may prevent people from acting. This supports findings by Tomaselli et al. (2023), who concluded that digital health literacy must be paired with emotional readiness, particularly in low-resource settings. For nurses, this reinforces the importance of psychoeducational support and empathy-driven counseling.

Remarkably, 65.3% of respondents thought that less than 50 Indonesians suffer from cancer, which is a glaring underestimation. Together with the fact that just 10.2% of respondents knew about cancer screening programs, 52% did not know, and 37.8% were not sure, the results show a serious lack of cancer literacy at the public level. This is in line with the Diffusion of Innovations idea (Rogers, 2003), which holds that even successful interventions may not spread fairly if information is not properly incorporated into social structures and cultural norms.

In terms of demographics, the majority of participants were older adults (70.7%), housewives (53.3%), and females (85.3%). This profile points to a lack of institutional health access or formal health campaign exposure. The Social Cognitive Theory states that patterned behavior reinforces behavioral change. social learning (Bandura, 2018), which may be limited for this group due to social isolation or lack of peer discussion. Thus, reliance on mobile health apps alone without complementary face-to-face strategies may be insufficient for sustainable behavior change in such populations.

Participants recognized the following risk factors on the risk factor ranking (Q11): lifestyle, genetic inheritance, environmental factors, chance, and aging. While there was no quantification of the ranking order, the inclusion of these components indicates some conceptual exposure to multiple causes of cancer. But the lack of awareness about screening stands in stark contrast to international public health objectives, like the Who is Global Strategy to Accelerate the Elimination of Cervical Cancer, which places a strong emphasis on early screening (WHO, 2020). This discrepancy indicates communication disparity, a notion defined by Viswanath et al. (2019), and implies lost chances in health promotion initiatives. It suggests that the groups that require information the most—such as low-income, elderly, and rural populations are the ones who are least likely to obtain or absorb it efficiently.



## CONCLUSION

There are still substantial knowledge gaps, especially in the areas of warning sign identification, risk factor comprehension, and screening program awareness, even though PEKA is moderately effective in encouraging early help-seeking behavior. The findings highlight the value of community-integrated, multimodal teaching methods, particularly for groups with lower educational attainment or computer literacy. PEKA and other mobile applications should not be viewed as stand-alone solutions, but rather as complementing tools.

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