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CDA Cancer Screening Strategies For Anxiety Health Checkup Cancer Screening

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KEYWORDS
cda screening; cancer; medical check up

ABSTRACT
The purpose of this study was to find out how anxiety affects cancer detection and how early detection efforts are carried out in conjunction with screening. The mixed methods study was conducted on 1002 random subjects. In addition, qualitative research models were conducted on laboratory specialists, health examiners and oncologists on CDA screening methods. This method does not cause reports of disease, but shows that there is a good tendency to cancer. The results of the study were processed using SEM PLS analysis using SmartPLS and expert opinion analysis using Facets. The expert source's opinion (expert decision) on the transfer of detection perception to screening using the CDA method is considered feasible and constructive. Reliability is calculated by the FACETS Program as a measure of sample variance, therefore, low values among a sample of raters indicate that the raters in the assessment are relatively homogeneous, with heterogeneous raters. There are no problems with convergent validity on the tested models; the AVE value of each construct exceeds 0.5, which means that the construct has good reliability. The results of PLS bootstrapping calculations showed a significant direct relationship between variables, suggesting a link between anxiety and health screenings.CDA screening can be an option to overcome health screening anxiety because it informs test results with a tendency between healthy findings and the likelihood of cancer appearing, rather than active cancer cells..

Introduction

Screening is a process or technique to find healthy individuals or population groups at risk or likelihood of experiencing certain conditions. To find suspicious cases, screening is carried out with the main purpose. On the other hand, the term "diagnostic" refers to additional testing and evaluation procedures performed to ascertain whether a person is suffering from a particular condition. To make a more accurate diagnosis, a more thorough diagnostic evaluation is performed after the screening process indicates the presence of possible conditions. Therefore, screening can be considered the first stage of a broader diagnostic process.

By promoting the health screening process, the Indonesian Ministry of Health seeks to reduce the number of drugs given to patients, especially those with cancer in Indonesia (Secretary General of the Indonesian Ministry of Health 2021). The courage to conduct early screening has been reduced by public fears that disease findings will have an impact on the detection process. So far, detection efforts that are known to the public come from diagnostic activities. The concept of healthy examination should be changed so as not to lead to the diagnosis or determination of the disease. According to 7 (seven) informants interviewed in the initial qualitative research, anxiety to take preventive action may be caused by a lack of information on the difference in detection and screening. In addition, there is an opinion that medical personnel face difficulties communicating well when explaining cancer prevention due to lack of information about cancer screening. Fear increases due to elusive terms, information flows, and screening techniques.

An important step in identifying cancer is cancer detection. In the fight against this deadly disease, cancer detection has become a very important area of research. There are many detection techniques used to diagnose cancer. Methods without using a device are called physical examinations, for example breast examination which is done by palpating to find out if there is a lump in the breast and skin cancer examination by medical personnel is done by visual examination of the skin to detect signs of suspicious skin changes that may be indicative of skin cancer. In addition, detection can be done through laboratory examination with tumor biomarkers. Tumor biomarkers are substances that are present in the body in response to the presence of cancer. Measurements of tumor biomarkers can provide early clues about the possible presence of cancer or, if found in abnormal amounts, it can be an indication of the presence of cancer. Tumor biomarkers are biological markers or indicators that can be used to detect, diagnose, or monitor the development of tumors or cancer in the body, in the form of blood tests such as PSA (prostate-specific antigen) for prostate cancer, CA-125 for ovarian cancer, or CA15-3 for breast cancer. To detect cervical cancer, cell retrieval through a smear called a pap smear is an additional method in addition to blood. MRI (Magnetic Resonance Imaging) is a medical imaging technique that uses magnetic fields and radio waves to produce highly detailed images of the body's tissues and organs, mammography that shows the presence of lumps or masses in the breast, or CT scans that show cancer in various parts of the body. Detection through biopsy is also known, which includes fine needle biopsy and excision biopsy, which removes the suspicious area or lump for thorough examination in a laboratory. All these detections resulted in the discovery that there was cancer, which is a medical condition(Lu, W., De Bock, G. H., Schaapveld, M., Baas, P. C., Wiggers, T., & Jansen, 2011) (Duffy, 2012) (Chu, W. G., & Ryu, 2016) (Krull, K. R., Hardy, K. K., Kahalley, L. S., Schuitema, I., & Kesler, 2018) (Morris, L. G. T., & Myssiorek, 2010) (Nagpal et al., 2016)

According to research conducted in 2021 by Xie Li, a cancer screening method that uses the measurement of electrical activity on blood cells can be an option to reduce general public anxiety regarding cancer screening procedures. Differences in the electrical activity of red blood cells indicate a cancer risk profile while the cells are still healthy (Xie et al., 2022)

Current technology allows cancer screening on a healthy scale, one of which is mapping through data algorithms conducted from blood samples. The electrical signals of blood cells are taken with this technique. Then, the signal patterns were combined with a database of various cell signals mapped from cancer conditions. The electrical capacitance of normal and cancer cells is different, and the properties of normal and cancerous cells are different when examined with infrared near light. Cancer cells are very different from normal cells morphologically and metabolically; This difference also occurs molecularly and physiologically. It is reported that the trend of the signal map indicates the emergence of cancer. Research conducted by Xie and his team found that the CDA test is useful for cancer screening in healthy people with high sensitivity and specificity. These results provide a theoretical and practical foothold for biophysical blood tests for cancer screening. (Du et al., 2015) (Tao et al., 2015) (Xie et al., 2022)

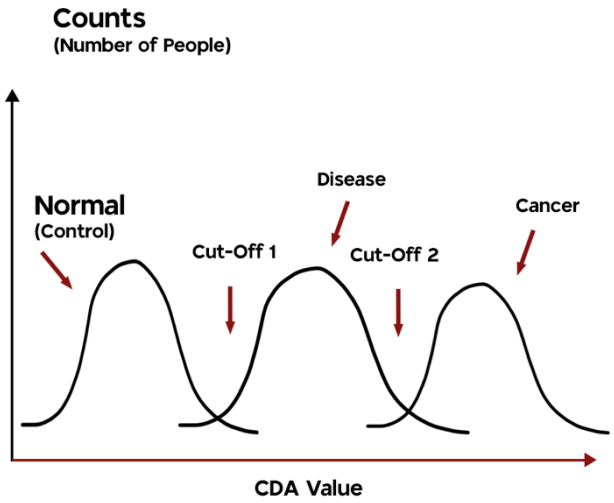


Figure 1.
Yield marker curve

This research effort is to change the paradigm of anxiety about cancer detection by interpreting CDA screening as an option to find the ratio of health to potential propensity for cancer to occur when cells are still healthy. This will provide a breakthrough in overcoming anxiety in health checks that produce sick information, into health checks with health ratio results that can produce a tendency to pain in cravings.

Theoretical underpinnings

Theory of Planned Behavior (TPB)

The theory of social psychology was first proposed by Icek Ajzen in 1985. This theory helps us understand and understand human behavior in a social context. TPB believes that not only intention influences a person's behavior, but also other factors influence intention. Three main components influence a person's behavior. First, attitude, which indicates a person's perception of the behavior they are about to perform. Next, subjective norms, which indicate the social pressure that a person feels to behave

according to the expectations of others. Lastly, perceived behavioral control, which indicates a person's beliefs about their ability to perform certain behaviors. (Ajzen, 2005)

The theory has been used to predict and understand human behavior in a variety of contexts, such as health behavior, consumer behavior, and organizational behavior, among others. The theory of the Health Belief Model, which explains the benefits of preventive measures and the threat of disease, helps to find behaviors to adopt a healthy lifestyle. Irwin M. Rosenstock, a social psychologist, developed this theory in the 1950s, by writing about the perception of vulnerability or perceived vulnerability, which refers to beliefs about the likelihood of getting a disease or condition. A woman should be sure that she may have breast cancer before having a mammogram. Then about the perceived severity or the perceived severity. Evaluation of medical and clinical consequences (such as death, disability, and pain) and possible social consequences (such as the impact of the condition on work, family life, and social relationships) is part of feeling about the seriousness of contracting a disease or not being treated. A perceived threat is a combination of vulnerability and severity. If a person feels a personal vulnerability to a serious health condition, there is also a perceived benefit or advantage (threat perception). It is possible that the obstacles that people see or the perceived obstacles prevent them from acting according to advice. Therefore, "the combined degree of vulnerability and severity provides the energy or power to act and the perception of benefits (minus the barriers) provides the preferred path of action". (Glanz et al., 2008; Rosenstock, 1974)

Medical check-up

A health checkup, also known as a medical exam, is done to prevent illness and find imbalances that can become worse later in life. The results of the medical examination are still more inclined to the findings of pain, so that public acceptance of the benefits is not in line with the purpose of its implementation to find trends in health changes before illness.

The Health Belief Model theory is the basis of this paradigm shift. According to (Rosenstock, 1974), it was created by researchers to focus their efforts on improving public health by understanding the reasons why people do not practice prevention . This model has also been used to create health communication interventions aimed at changing health-related behaviors . The use of tumor biomarkers created by tumor cells that indicate early illness is different from approaches that approach healthy ratios in family health screenings of cancer patients (Harrington, 2013; Jones et al., 2015; Lee et al., 2019; Prochaska et al., 2009).

Research Methods

The study used qualitative and quantitative mixed method model analysis to see the relationship between public anxiety in cancer *medical checkup* activities and expert opinions on the choice of CDA cancer screening model to overcome anxiety caused by the paradigm of being sick and healthy.

The stages of this study, namely:

1. Quantitative with anxiety data collection using questionnaires
2. Qualitative with expert opinion on CDA cancer screening journal

Research Completeness

The quantitative questionnaire consists of three dimensions and consists of 49 questions. for the general public throughout Indonesia, as well as families of cancer patients as sample respondents. Experts including oncologists, clinical pathologists academics, clinical pathology practitioners, general practitioners, and cancer survivors

were asked to answer essay questions on screening techniques. The SmartPLS application is used to process quantitative data from respondents throughout Indonesia. This application uses structural model specifications to process PLS-SEM analysis. The next step is to design a measurement model. The model shows the relationship between the construct and the indicator variables that measure it. This model can be used on reflective or formative types. Next, the results are interpreted based on the results of the model predicting relationships between hypothetical variables, with bootstrap confidence intervals. The bootstrapping method is used to evaluate the significance of the path coefficient. The "accidental sampling" sampling technique is used to conduct studies with the general population and families of children suffering from cancer (Hair et al., 2013; Haryono, 2017)

The expert assessment method on the question items was modified using Lawshe's research methodology to measure the validity of the content or the validity of the content of the measurement instrument. In addition, expert assessment methods are used to conduct qualitative data analysis of expert decisions using FACETS.

Results and Discussions

Research model overview

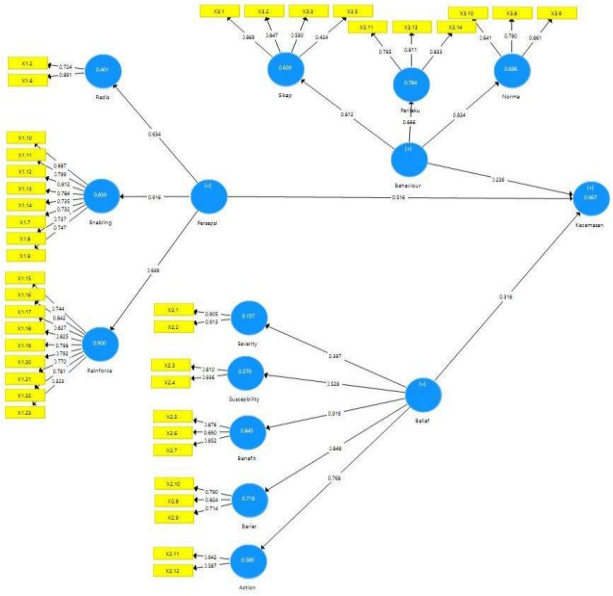


Figure 2
Smart PLS Research Model

Descriptive Respondents

Questionnaire data of 1002 from all provinces of Indonesia (38 provinces) that reached a greater ratio of respondents without cancer, with the productive age group reached as the most respondents.

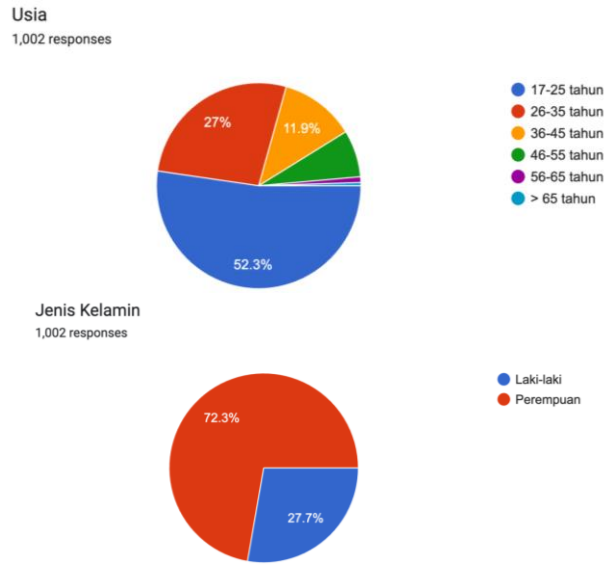
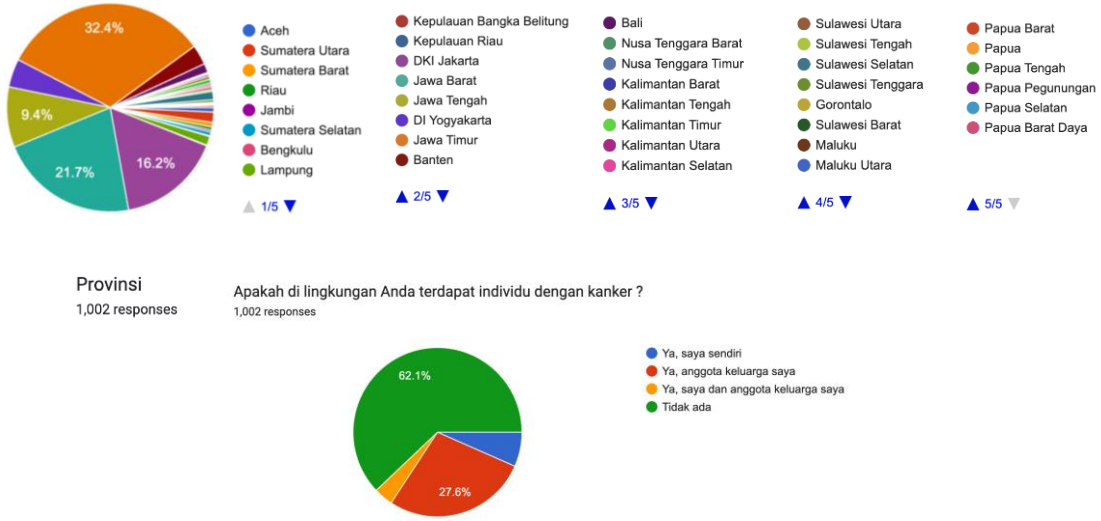


Figure 3. Respondent Data



Instrument Analysis (Expert Judgement)

Qualitative Data

Lawshe's research method was then used to process the results of expert assessments in the question section to evaluate the validity of the content. Lawshe's validity index ranges between 0 and 1, with values higher than 1 indicating that the item is highly relevant. Lawshe's method allows researchers to ensure that measurement instruments have accurate designs.

Table 2
Instrument Assessment Results (Lawshe)

No.	Assessed aspects	Judging Criteria	Expert Validators					Average	Average per aspect	Quality	Percentage
			1	2	3	4	5				
1	Suitability of aspects of	1	4	4	3	4	3	18	0,72	SB	72%

	cancer screening assessment with existing indicators	2	4	4	4	3	3	17		
2	Writing	3	3	5	4	3	4	18		
		4	5	4	5	4	4	19	0,84	SB	84%
		5	4	5	5	4	4	18		
3	Language	6	3	4	5	4	3	19		
		7	4	4	3	3	4	19	0,79	SB	79%
		8	4	5	5	4	4	17		
4	Product Assessment Aspects	9	3	4	4	4	3	18	0,82	SB	82%
		10	3	4	5	3	5	18		
		11	5	3	5	5	4	22		
		12	4	4	5	4	5	22		
Number of Scores			46	50	53	45	46	181	44,75	SB	89,5%

The table above shows a summary of the results of the five assessors' assessment of the instrument. Performance conformity with existing indicators, conformity with writing indicators, language, and product assessment are all elements of assessment.

The results of the qualitative validity test on shifting perception (paradigm shift) detection to screening conducted using CDA method research options show that the agreement is feasible and constructive. Table 1 presents the average score of the ratings given by each rater on a scale of 1 to 5. We also present the severity of raters (in logits), measures of accuracy (standard errors), averages according to statistical squares, and correlations between each rater's score and other raters. Undesirable, the raters differ in intensity.

Table 1
Data Facets 1

Total Score	Total Count	Obsvd Average	Fair(M) Average	Measure	Model S.E.	Infit MnSq	Infit ZStd	Outfit MnSq	Outfit ZStd	Estim. Discrm	Correlation PtMea	Correlation PtExp	N Raters
45	4	11.25	11.23	.95	.68	.48	-.5	.50	-.2	1.27	.94	.96	4 Rivo
46	4	11.50	11.44	.54	.60	.56	-.5	.70	-.2	1.41	.94	.96	1 Purwanto
46	4	11.50	11.44	.54	.60	1.05	.3	1.10	.3	.77	.98	.96	5 Zubairi
50	4	12.50	12.58	-.66	.55	1.47	.8	1.28	.6	1.09	.97	.96	2 Suryani
53	4	13.25	13.28	-1.37	.66	.44	-.6	.70	-.1	1.25	1.00	.98	3 Dyah
48.0	4.0	12.00	11.99	.00	.62	.80	-.1	.84	.0		.97		Mean (Count: 5)
3.0	.0	.76	.80	.87	.05	.40	.6	.32	.4		.02		S.D. (Population)
3.4	.0	.85	.89	.98	.05	.45	.7	.35	.5		.02		S.D. (Sample)

Model, Sample: RMSE .62 Adj (True) S.D. .75 Separation 1.22 Strata 1.96 Reliability .60
Model, Fixed (all same) chi-square: 9.4 d.f.: 4 significance (probability): .05

The severity of the assessments produced by the FACETS program is shown in Table 1. The raters showed an acceptable match according to the Defect measure and Achieved well between 1.50 and 0.50, which indicates good consistency in the assessment. In terms

of rater, the corresponding index can be used as a measure of intra-rater reliability, where the difference between the appropriate size and the optimal value of 1.00 indicates an unexplained percentage of noise in the response pattern (Wright & Linacre, 1994). The FACETS program calculates reliability as sample variance.

In the same way, the fixed effect X2 indicates that these raters are statistically different in rating; the nature of independence of the rater parameters can be established ($X2 = 9.4$, $df = 4$, $p < 0.05$), which indicates that such raters have different validity. The results of the separation index and chi square values agree and point in the same direction, indicating that there are two distinct groups—the expert group and the beginner group—in the data.

Table 2
Facet Data 2

Measr	-Raters	-Aspect	Scale
10			(19)
9		indicator	
8			17
7			16
6			
5			15
4			
3			
2			14
1	Rivo Purwanto Zubairi	Language	
0		Writing	13
	Suryani		
-1			12
	Dyah		
-2			
-3			11
-4			
-5			
-6			
-7		Appearance	(6)
Measr	-Raters	-Aspect	Scale

The variable map (Figure 1) shows the unit of measurement (column 1) between −7 and +10 logits, which is the result of facet software reliability. Column 2 indicates the difficulty of the aspect, column 3 indicates the function of the rating scale, and column 4 indicates the severity of the assessment on the same interval scale, creating a single frame of reference. Column 3 shows the variation in aspect difficulty.

The severity of the rater is defined as the tendency of the rater to assign a lower value than other raters to the same participant as the quality of the information. It is also true for appraiser waivers. Hard to soft characteristics range from +10 to −7 logits, as shown in the variable map. The ratings are obviously not uniform, but because there are

four ratings, the spread looks good. In a sample of five raters, there was one statistically distinct stratum of severity, according to an assessor separation ratio of 1.22 and a stratum index of 1.96. In other words, they did not create homogeneous groups, as anticipated.

Quantitative Data

Outer Model

In this study, the AVE values and the square root of AVE for each construct are presented in table 3.

Table 3
AVE

	Cronbach's Alpha	Composite Reliability	Average Extracted Variance (AVE)
Action.	0,440	0,753	0,616
Barriers.	0,683	0,820	0,604
Behaviour.	0,842	0,881	0,516
Belief.	0,861	0,895	0,554
Benefit.	0,843	0,906	0,762
Enabling.	0,892	0,914	0,570
Anxiety.	0,943	0,949	0,523
Norm.	0,653	0,808	0,587
Behaviour Control.	0,726	0,845	0,646
Perception.	0,941	0,947	0,516
Predisposing.	0,497	0,792	0,659
Reinforce.	0,901	0,922	0,578
Severity.	0,790	0,905	0,826
Attitude.	0,658	0,788	0,500
Susceptibility.	0,712	0,867	0,767

The constructs in this research model are considered to have good discriminant validity because there are no validity convergent issues in the tested model, as shown in table 3. The Average Variance Extracted (AVE) value of each construct in this study is above 0.5, so there is no convergent validity problem in the model tested.

In addition to measuring convergent and discriminant validity values, outside the model can also be measured by measuring construct reliability or latent variables. This can be done by looking at the composite reliability value of the indicator block that measures the construct. The combined value of reliability for each construct is above the value of 0.7, so it can be concluded that each construct has good reliability according to the indigo limit.

In addition to assessing the validity of convergents and discriminants, the outside of the model can also be measured by measuring the reliability of constructs or latent variables. This is done by looking at the cronbach alpha value of the indicator block that measures the construct; A construct is considered reliable if its Cronbach alpha value is greater than 0.7, as shown in Table 1 of the model. Thus, it can be concluded that all constructs have a cronbach alpha value above 0.7.In this study, multivariate data analysis

techniques were used to model the relationship between various variables with SEM PLS (Model Equation Structural Partial Least Squares). The PLS SEM model, operated through the SMARTPLS program, has one or more latent (var) constructs (Caraka et al., 2020).

Inner Model

The R2 values for each endogenous latent variable in table 2 indicate that the R2 values of Barrier, Benefit, Enabling, Norm, Behavior, and Attitude are in the range of values above 0.67, indicating that they are categorized as strong. The R2 values of Action and Redis are in the range of values above 0.33, which indicates that they are categorized moderate.

Table 4
R value

	R Square	Adjusted R Square
Action	0,589	0,589
Barriers	0,719	0,718
Benefit	0,845	0,845
Enabling	0,839	0,838
Anxiety	0,967	0,966
Norm	0,696	0,696
Behavior	0,784	0,784
Predisposing	0,401	0,401
Reinforce	0,900	0,900
Severity	0,157	0,156
Attitude	0,659	0,658
Susceptibility	0,279	0,278

In PLS, testing each relationship is done using a simulation with *bootstrapping* method against the sample. This test aims to minimize problems with abnormal research data. The results of testing with bootstrapping method from Smart PLS analysis are as follows:

Table 5
Bootstraping

	Original Sample (O)	Sample Average (M)	Standard Deviation (STDEV)	T Statistik (|O/STDEV|)	P Values
Behavior -> Anxiety	0,236	0,235	0,014	16,567	0,000
Behavior -> Norm	0,834	0,834	0,011	75,060	0,000
Behavior -> Behavior Control	0,886	0,885	0,008	109,515	0,000
Behavior -> Attitude	0,812	0,812	0,013	61,905	0,000
Belief -> Action	0,768	0,767	0,014	53,918	0,000
Belief -> Barier	0,848	0,848	0,011	74,341	0,000

Belief -> Benefit	0,919	0,919	0,007	141,365	0,000
Belief -> Anxiety	0,318	0,318	0,014	22,052	0,000
Belief -> Severity	0,397	0,394	0,032	12,455	0,000
Belief -> Susceptibility	0,528	0,528	0,028	18,648	0,000
Perception ->Enabling	0,916	0,916	0,007	138,483	0,000
Perception-> Anxiety	0,516	0,517	0,014	36,511	0,000
Perception -> Predisposing	0,634	0,633	0,025	24,930	0,000
Perception-> Reinforce	0,949	0,949	0,004	267,486	0,000

Table 3 shows the results of PLS calculations that state the direct relationship between variables. It is said that there is a direct relationship if the p-value < 0.05 and it is said that there is no direct relationship if the p-value > 0.05. Based on table 4.12, it can be stated as follows:

1. Behavior variables have a significant effect on educator anxiety with P-Value values of 0.000 < 0.05.
2. Behavior variables have a significant effect on norm variables with P-Value values of 0.000 < 0.05.
3. Behavior variables have a significant effect on behavioral variables with P-Value values of 0.000 < 0.05.
4. The Belief variable has a significant effect on the action variable with a P-Value value of 0.000 < 0.05.
5. The Belief variable has a significant effect on the barrier variable with a P-Value value of 0.000 < 0.05.
6. The Belief variable has a significant effect on the benefit variable with a P-Value value of 0.000 < 0.05.
7. The Belief variable has a significant effect on the anxiety variable with a P-Value value of 0.000 < 0.05.
8. The Belief variable has a significant effect on the severity variable with a P-Value value of 0.000 < 0.05.
9. The Belief variable has a significant effect on the Suscepbility variable with a P-Value value of 0.000 < 0.05.
10. The Perception variable has a significant effect on enabling variables with P-Value values of 0.000 < 0.05.
11. The Perception variable has a significant effect on the anxiety variable with a P-Value value of 0.000 < 0.05.
12. The Perception variable has a significant effect on the redis variable with a P-Value value of 0.000 < 0.05.
13. The Perception variable has a significant effect on the reinforce variable with a P-Value value of 0.000 < 0.05.

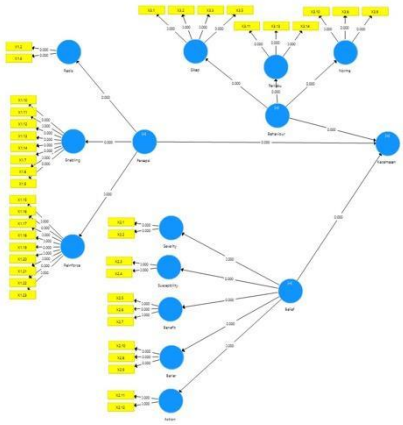


Figure 4
Bootstrapping

Discussion

In Xie Lie's journal, the words stating that anxiety is the result of a medical examination that indicates pain or pain markers will be addressed with the new idea of providing health markers that undergo changes. Because Indonesians are afraid of early screening, the burden of cancer is a scourge. Healthy behaviors supported by information about health disorders should be a concern. The paradigm known as screening and detection for diagnostics equates health screening with disease determination. The study shows efforts to improve health behaviors in the management of the cancer burden, starting with encouraging people to do their health profile because they know how health screening and diagnostic detection differ in the management of anxiety. Using CDA (Cancer Differentiation Analysis) technology, Xie Lie's research on cancer screening shows the dynamics of electrical activity in red blood cells. These activities can provide information about healthy activities as well as emerging predispositions to cancer conditions.

Therefore, a tendency towards health changes can be identified early on before changes that indicate the presence of a sick condition. Low, medium, and high risk markers report a trend, which should be confirmed immediately by subsequent examination of tumor markers. Additional research looking at CDA data on comparison groupings with different types of cancer suggests that a database of electrical activity in red blood cells may serve as a screening method that can support education programs and healthy lifestyles to prevent cancer. Periodic health checks are routine processes carried out periodically by individuals or communities to monitor and assess their health condition. The purpose of these periodic health check-ups is to detect health problems early, prevent disease, and raise awareness of a healthy lifestyle and wellness. In healthy living without cancer campaigns, information about health changes before illness can be used as educational material. By using CDA cancer screening, periodic health screenings become part of routine data in the management of healthy communities. For cancer survivors and their families, regular health checkups are essential to monitor them after treatment. It helps detect recurrence or long-term side effects of cancer treatment. This is also known as secondary prevention, which means detecting cancer early if there is a chance of the cancer coming back or another cancer developing. Screening trends in health status changes, which help health systems be more proactive in providing appropriate and efficient health services, can reduce anxiety due to a paradigm shift in screening, which should be a healthy condition screening process to detect illness. This

routine data can also help with health research and public health policy decision-making processes.

Adopting a healthy lifestyle is necessary when caring for a cancer patient within the family because it not only promotes the patient's wellbeing but also improves the health of the entire family. A healthy lifestyle can help the family create a supportive environment that will benefit everyone's well being while assisting the cancer patient's recovery. Always seek the advice of medical specialists, especially the patient's medical team, to make sure any lifestyle modifications are suitable and secure for the unique requirements and circumstances of the cancer patient.

Support with recurrent data of low-risk cancer potential can help people to live productively. Living a productive life while maintaining a healthy lifestyle is a transformational journey that has many advantages and improves general well being. A healthy lifestyle also encourages better stress management, which lessens the effects of life's pressures and enhances creativity and decision-making. Adopting a healthy lifestyle without anxiety of medical checkup will increase personal accomplishments while also fostering a sense of fulfillment, which is the cornerstone of a successful life.

Conclusion

The overall variable relationship in the study displayed a P-value of 0 which means that there is a hypothetical relationship between anxiety and the cancer detection process. The reliability results of experts (expert judgment/rater) do not create homogeneous groups, the nature of independence in the parameters of the rater can be established giving different validity. Expert advice on the introduction of the CDA cancer screening model is adequate, noting the need to continue the means for definitive screening with clear SOPs.

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