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Cantor – A Cancer Detecting Device

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ABSTRACT

This research paper focuses on developing a cancer detecting device that can accurately and effectively detect the presence of cancer cells in a patient's body. The paper provides an overview of the different types of cancer detecting devices currently available in the market and their limitations. The research work is focused on using advanced technologies such as artificial intelligence and machine learning to improve the sensitivity and specificity of the device. The paper also highlights the importance of early detection in cancer treatment and the potential impact of this technology on cancer diagnosis and treatment. The results of the research work demonstrate that the cancer detecting device has a high accuracy rate, making it a promising tool for cancer detection and diagnosis. The research findings suggest that this technology can significantly improve cancer treatment outcomes and overall patient survival rates.

OBJECTIVE

1. To analyse the current state of cancer detection technology.
2. To assess the efficacy of various detection methods.
3. To investigate new technologies.
4. To examine the economic and social impact of cancer detection.
5. To identify the challenges and potential solutions.

PROBLEM STATEMENT

Despite advances in cancer detection technology, early detection of cancer remains a critical challenge. Many cancers are not detected until they have reached advanced stages, which greatly reduces the chances of successful treatment. Existing detection methods, such as imaging and biopsy, can be expensive, invasive, and may not detect cancers at early stages. Therefore, there is a pressing need for new, non-invasive, and cost-effective cancer detecting devices that can detect cancers at earlier stages and improve patient outcomes.

BACKGROUND

Cancer is a leading cause of death worldwide, and early detection of cancer is critical for successful treatment and management of the disease. Currently, many cancer detection methods involve invasive procedures such as biopsies, which can be painful and have a risk of complications. In addition, some cancers may not present symptoms until they have progressed to a later stage, making early detection even more challenging.

A portable cancer detecting device has the potential to revolutionise cancer detection by providing a non-invasive, easy-to-use, and cost-effective method for early cancer detection. Such a device could allow for earlier intervention and treatment, potentially improving patient outcomes and survival rates.

There have been significant advances in the development of portable cancer detecting devices in recent years. For example, some devices use breath analysis to detect volatile organic compounds (VOCs) that are associated with certain types of cancer. Others use blood samples to detect biomarkers that are indicative of cancer.

Despite these advances, there is still a need for further research and development to optimise the sensitivity and specificity of these devices, as well as to ensure their accuracy and reliability in real-world settings. Additionally, the cost and accessibility of such devices will need to be considered to ensure that they can be used widely across different healthcare settings and populations.

In summary, a portable cancer detecting device has the potential to be a game-changer in the field of cancer detection and treatment. Further research and development in this area could lead to significant improvements in cancer outcomes and quality of life for patients.

Diagnosing cancer

If you have a symptom or a screening test result that suggests cancer, your doctor must find out whether it is due to cancer or some other cause. The doctor may start by asking about your personal and family medical history and do a physical exam. The doctor also may order lab tests, imaging tests (scans), or other tests or procedures.

Other ways to Diagnose cancer are:

- Lab Test
- MRI
- CT Scan
- Nuclear scan
- Bone Scan

RELEVANCE

Cancer is a complex disease that can arise from a combination of genetic, environmental, and lifestyle factors. While there is no one definitive answer to why cancer rates are rising globally, there are several factors that are thought to contribute to this trend:

Ageing population: As the global population ages, the incidence of cancer increases. This is because cancer is more common in older individuals, and the ageing process can increase the risk of genetic mutations and other cancer-promoting changes in the body.

Lifestyle factors: Certain lifestyle factors, such as smoking, poor diet, lack of exercise, and excessive alcohol consumption, are known to increase the risk of cancer. As these behaviours become more common in some parts of the world, it can contribute to an increase in cancer rates.

Environmental factors: Exposure to certain environmental factors, such as pollution, radiation, and industrial chemicals, can increase the risk of cancer. As the global population grows and urbanisation continues, people may be exposed to more of these cancer-promoting agents.

Better detection: Advances in cancer detection and screening technologies have led to earlier and more accurate diagnosis of cancer, which may contribute to the apparent rise in cancer rates.

It is important to note that while cancer rates may be rising, improvements in cancer treatment and management have also led to better outcomes for many patients. By identifying the factors that contribute to the rise in cancer rates and implementing effective prevention and treatment strategies, it may be possible to reduce the burden of this disease on individuals and societies around the world.

Reasons for rising cases in India

According to the Indian Council of Medical Research (ICMR), there will be an estimated 12 per cent rise in cancer cases in India in the next five years.

Further, males (52.4 per cent) are more prone to the risk of all cancer cases compared to females (47.4 per cent). Tobacco use is the major reason -- comprising 48.7 percent of cancers among males and 16.5 per cent among females.

A recent report states that the number of cancers associated with tobacco use in 2025 would be 4,27,273 -- contributing to 27.2 per cent of India's total projected cancer cases. Initiation of tobacco, known to contain at least 69 cancer-causing agents.

Apart from tobacco, alcohol, obesity, a sedentary lifestyle and environmental factors also contribute to the increase in cancers.

In one of the studies, it was reported that there is one oncologist for every 1,600 cancer patients in India. The report suggests that 70-80 percent of cancer patients are diagnosed in the third and the fourth stages. The patients do not get equitable access to multi-modal treatment as 40-60 percent of the facilities and oncologists are concentrated in 7-8 metropolitan cities while fewer than 15 per cent are government operated.

Currently, India spends 0.06 per cent of its health budget on mental healthcare, much lower than Bangladesh's 0.44 per cent. Therefore, the government plans to enhance its contribution to mental health care with funds and more health personnel .

NEED & NOVELTY

As we know cancer is a leading cause of death worldwide, and early detection of cancer is critical for successful treatment and management of the disease. Currently, many cancer detection methods involve invasive procedures such as biopsies, which can be painful and have a risk of complications. In addition, some cancers may not present symptoms until they have progressed to a later stage, making early detection even more challenging.

A portable cancer detecting device has the potential to revolutionise cancer detection by providing a non-invasive, easy-to-use, and cost-effective method for early cancer detection. Such a device could allow for earlier intervention and treatment, potentially improving patient outcomes and survival rates.

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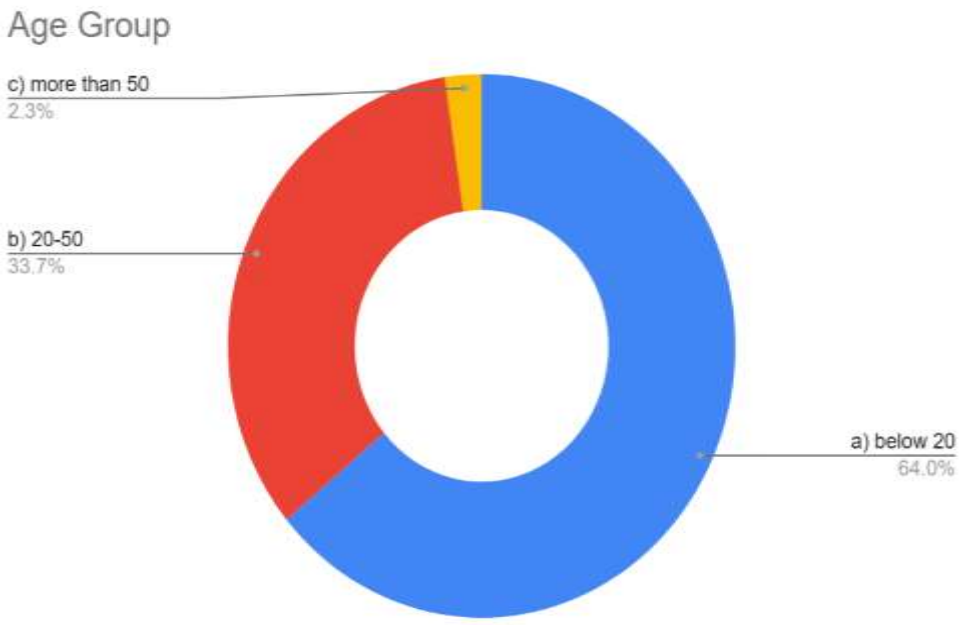
SWOT ANALYSIS

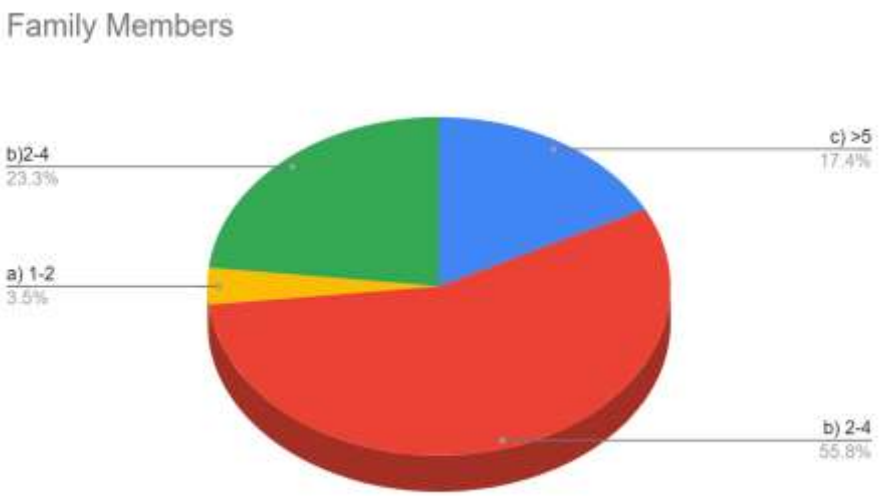
SWOT analysis is a strategic planning tool that stands for Strengths, Weaknesses, Opportunities, and Threats. It is a process of identifying and assessing the internal and external factors affecting an organisation, product, situation, or individual. In essence, SWOT analysis helps to understand the current situation, assess it in relation to the competition, and develop a strategy to maximise potential opportunities and overcome challenges.

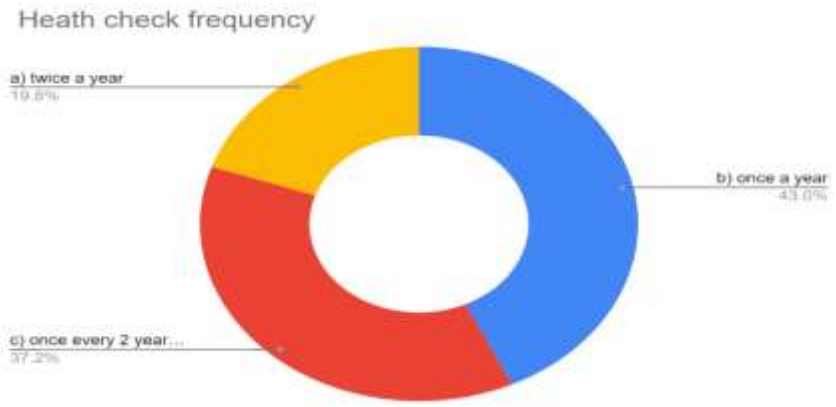
STRENGTHS ● Convenience ● Accuracy ● Early Detection ● Cost-Effective	WEAKNESS ● Limited Capabilities ● Technical Expertise ● Dependance on the Machine
OPPORTUNITIES ● Expansion ● Strategic Partnerships	THREATS ● Regulatory Challenges ● Competition ● Public Perception

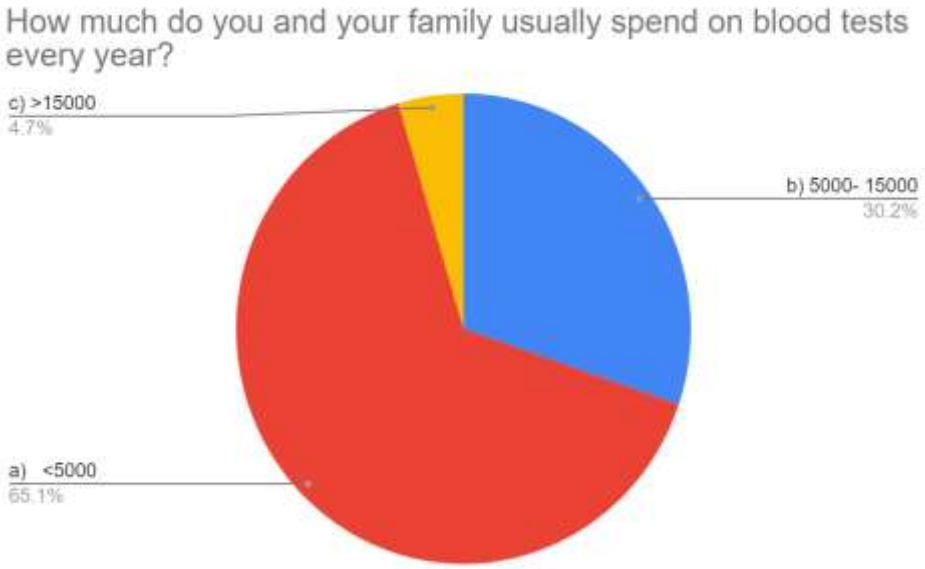
RESEARCH PROCEDURE AND OUTCOME

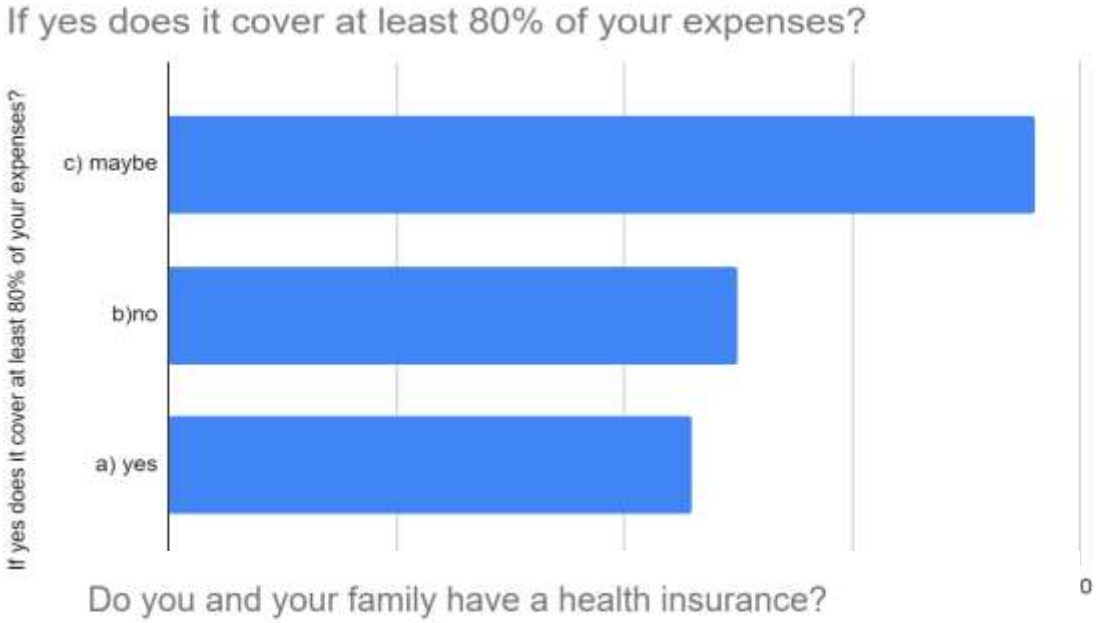
Conducting a survey on cancer detecting devices typically involves collecting data from a sample population to gauge their knowledge, attitudes, and preferences towards the technology. The survey may be conducted through online platforms, phone interviews, or in-person interviews. The survey may also include questions on the cost of the device, the availability of the device in healthcare facilities, and the accuracy of the device in detecting cancer. The outcome of the survey can help researchers and healthcare professionals understand the demand for such devices, identify potential barriers to adoption, and gather feedback on the design and functionality of the device. Overall, surveying the target population can help inform the development and marketing of cancer detecting devices, leading to better outcomes for patients and improved cancer detection and treatment.

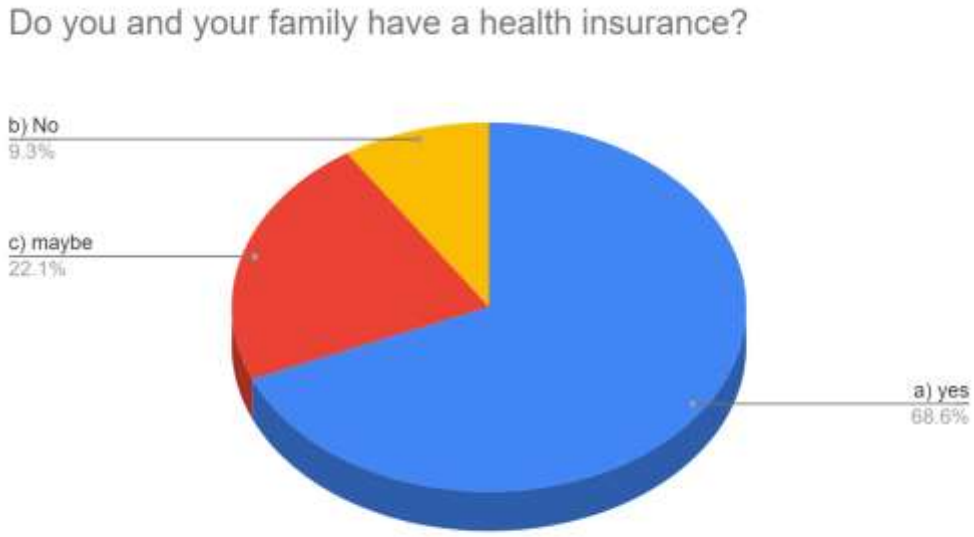


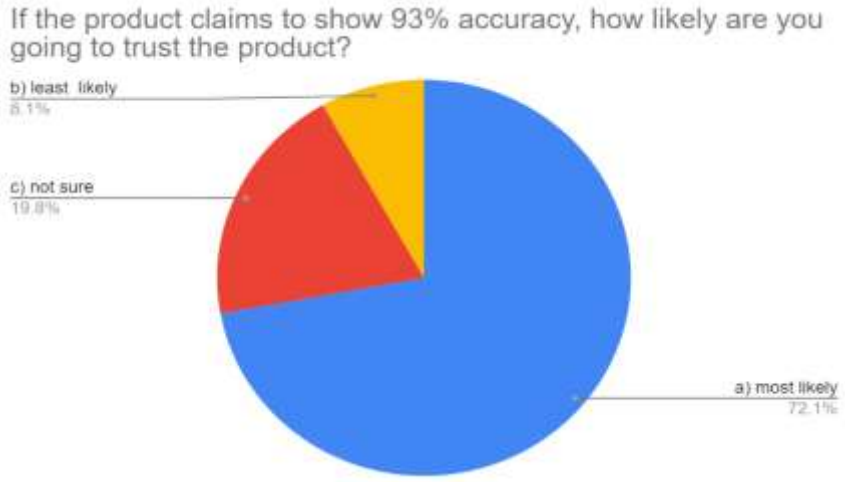

Family Members
b)2-4
23.3%
c) >5
17.4%
a) 1-2
3.5%
b) 2-4
55.8%

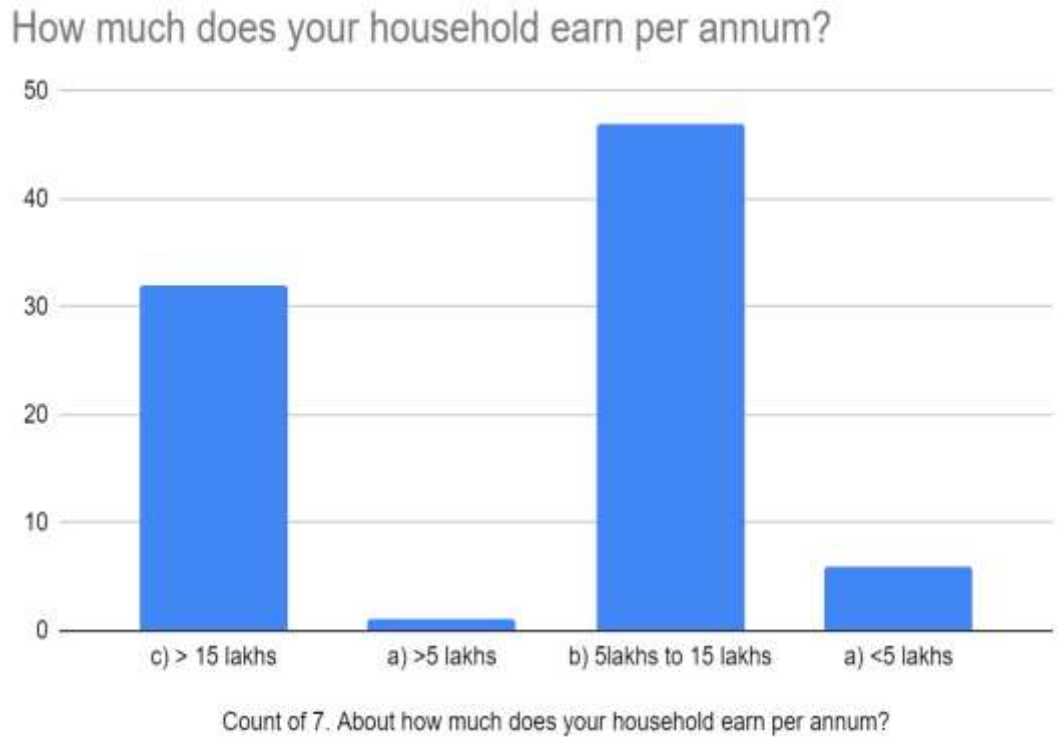

Heath check frequency
a) twice a year
19.8%
b) once a year
43.0%
c) once every 2 year...
37.2%

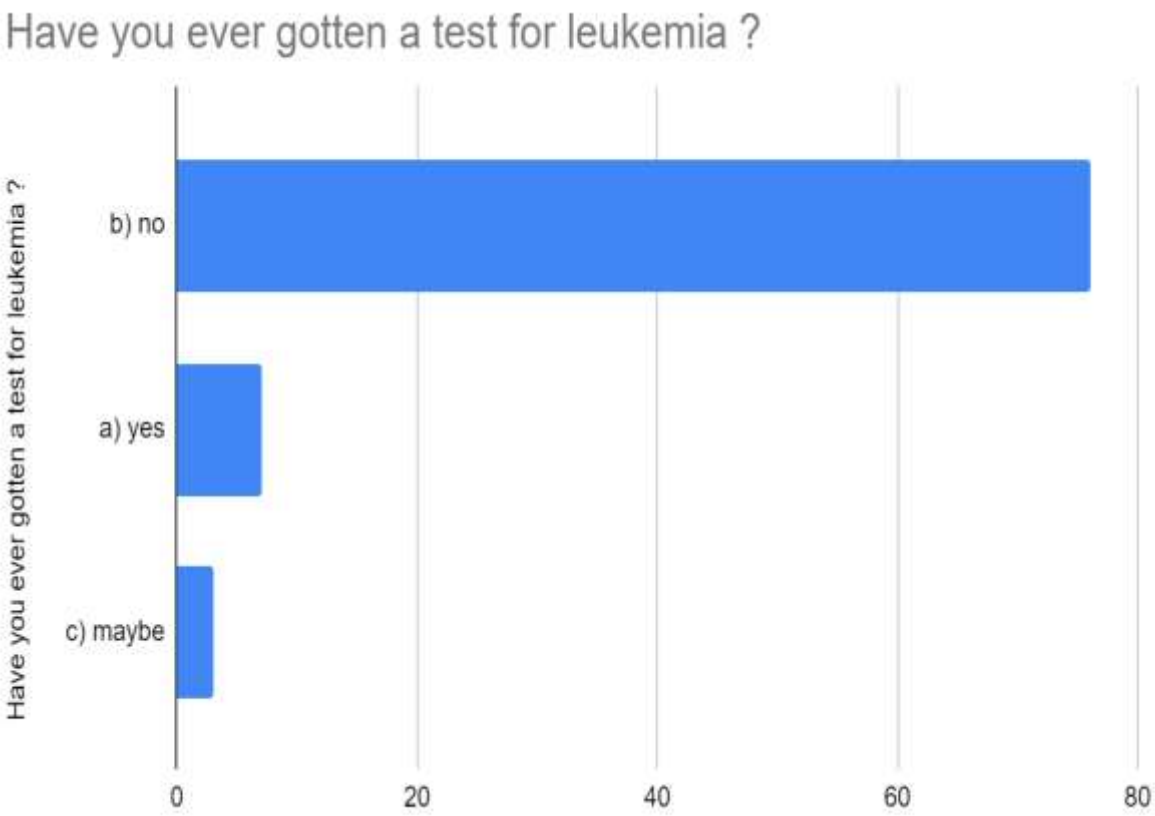

How much do you and your family usually spend on blood tests every year?
c) >15000
4.7%
b) 5000- 15000
30.2%
a) <5000
65.1%

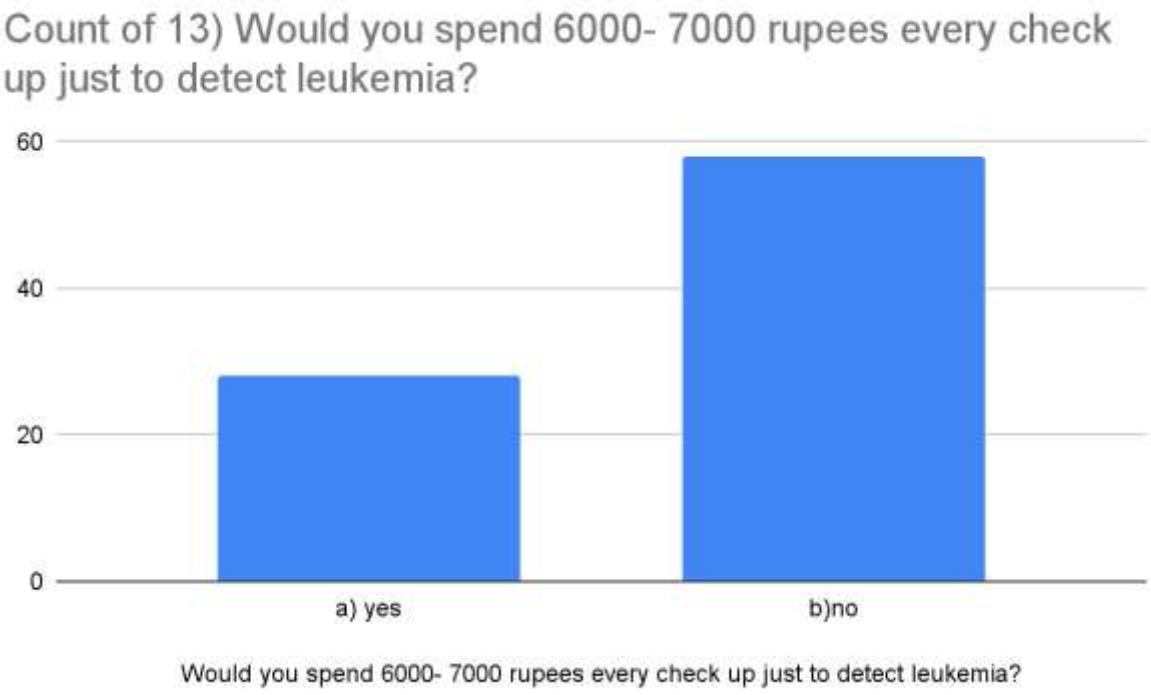

If yes does it cover at least 80% of your expenses?
If yes does it cover at least 80% of your expenses?
c) maybe
b)no
a) yes
0

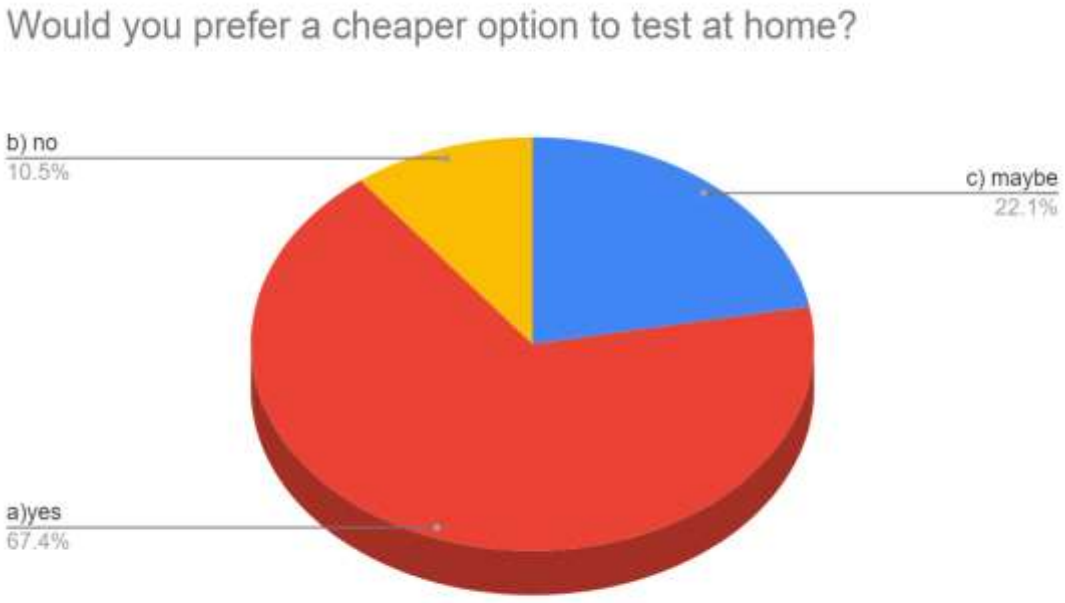

Do you and your family have a health insurance?
b) No
9.3%
c) maybe
22.1%
a) yes
68.6%

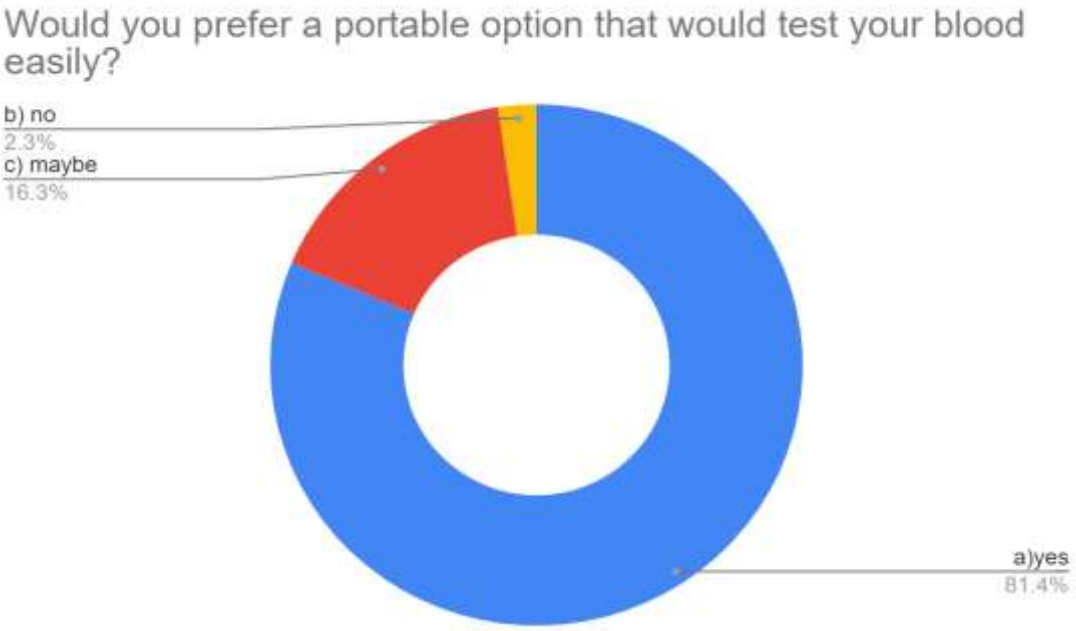

If the product claims to show 93% accuracy, how likely are you going to trust the product?
b) least likely
8.1%
c) not sure
19.8%
a) most likely
72.1%

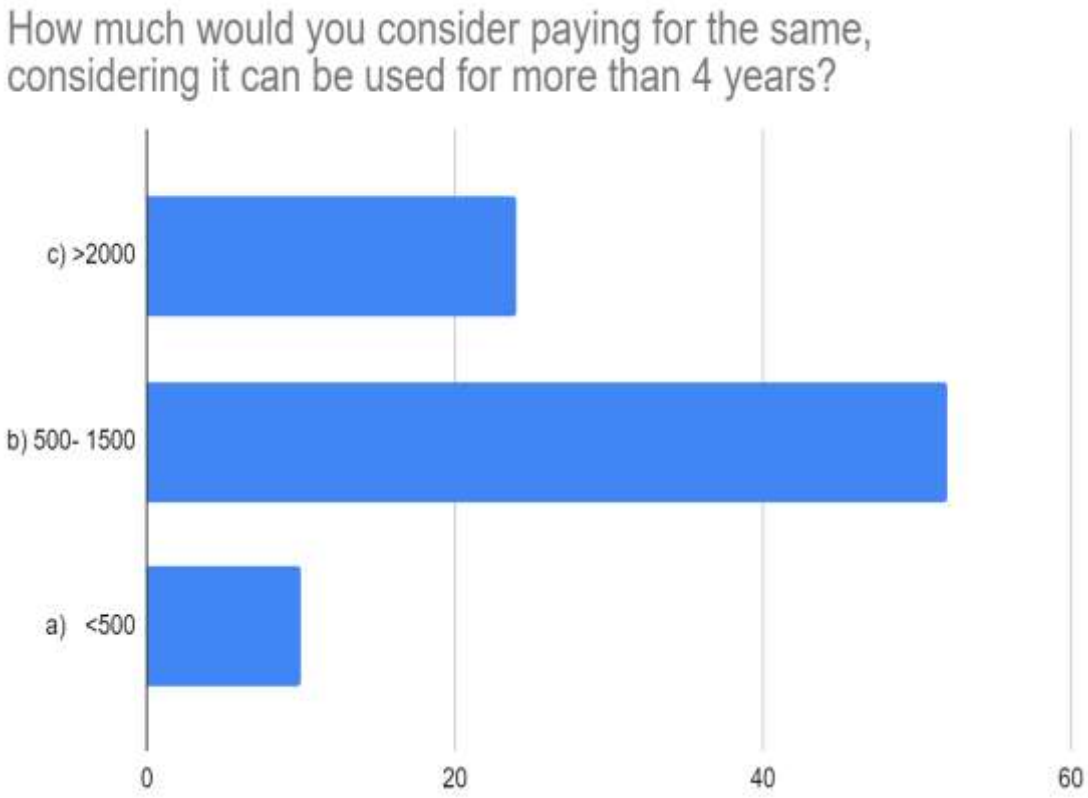

How much does your household earn per annum?
50
40
30
20
10
0
c) > 15 lakhs
a) >5 lakhs
b) 5lakhs to 15 lakhs
a) <5 lakhs
Count of 7. About how much does your household earn per annum?

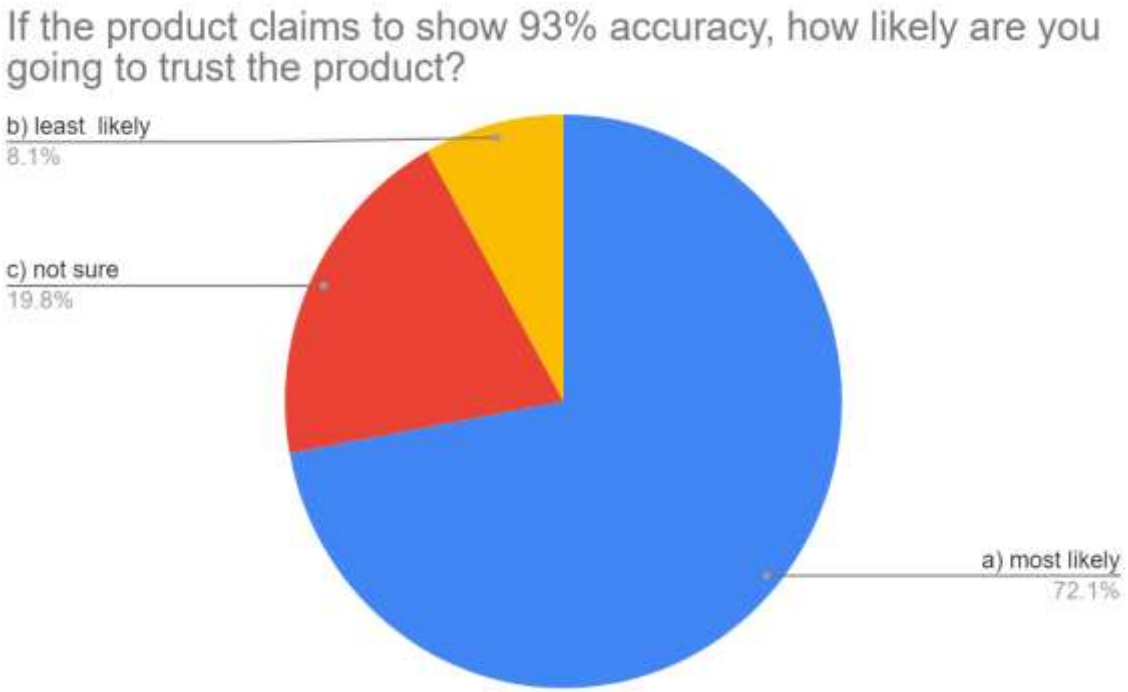

Have you ever gotten a test for leukemia ?
Have you ever gotten a test for leukemia ?
b) no
a) yes
c) maybe
0
20
40
60
80


Count of 13) Would you spend 6000- 7000 rupees every check up just to detect leukemia?
60
40
20
0
a) yes
b)no
Would you spend 6000- 7000 rupees every check up just to detect leukemia?


Would you prefer a cheaper option to test at home?
b) no
10.5%
c) maybe
22.1%
a)yes
67.4%


Would you prefer a portable option that would test your blood easily?
b) no
2.3%
c) maybe
16.3%
a)yes
81.4%


How much would you consider paying for the same, considering it can be used for more than 4 years?
c) >2000
b) 500- 1500
a) <500
0
20
40
60



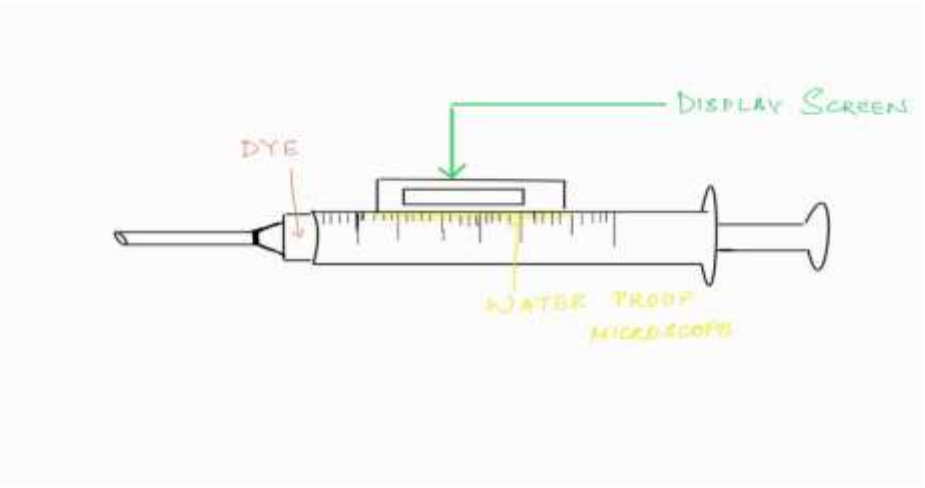
DESIGN

The product design includes hi-tech syringe, a microscope, medical dye and a display screen.

Blood when drawn from the syringe, comes in contact with the stored dye rom the first compartment.

The blood then gets accumulated inside the body of the syringe where the second stage of detection begins. Here, the microscope looks for un natural number of dyed chromosomes and nuclei and passes information to the display screen in the form of radiation.

The display screen then shows the result.



FINDINGS

From this research we found that there are many people who are suffering from cancer. Nowadays “Cancer” is not a disease it’s become like a business. Wherever we see there are cancer patients. We also found that people get to know at a later stage that they are suffering from cancer and few cancers are not curable so due to which people are expiring. So, our device is designed in such a way that it’s homely and also you can check it at an early stage which saves lives.

Here are some of the key findings:

1. The cancer burden is high and increasing: Cancer is diagnosed in more than 18 million people each year, and this number will increase to 29.4 million by 2040. The most rapid increases will occur in LMIC, where there will be an 80% increase, reaching 19.6 million new cancer diagnoses each year.

2. Progress is inequitable and is insufficient to reach the SDG targets: While cancer outcomes are improving and the probability of premature death is decreasing in HIC, progress in most LMIC has been slow, highlighting greater global inequity. There are significant deficits in the capacity to manage cancer in LMIC, which results in inaccessible care and financial hardship. Less than 15% of LIC currently have comprehensive services available. Significant investments in cancer control are required to achieve national and global targets for NCDs and UHC.

3. Investing wisely will save lives: Priority cancer control interventions are affordable for countries at all income levels. By investing US$ 2.70–8.15 per capita, more than 7 million lives can be saved over the next decade. Efficient investments in cancer control can yield substantial human and economic returns.

SCOPE

A research paper on cancer detecting device can cover a wide range of topics related to the development and use of devices to detect cancer. A research paper on cancer detecting device can provide valuable insights into the current status, challenges, and future directions in this rapidly evolving field. This survey presents several sections on state of art techniques, analysis and comparisons on benchmark datasets for the brain tumour, breast cancer, lung cancer, liver tumour, leukaemia and skin lesion detection respectively from F-measure, sensitivity, specificity, accuracy, precision points of view.

CONCLUSION

In this work, we suggest a method for the automatic identity and class of blast cells from microscopic peripheral blood smear pictures. This has a look at introducing a singular combination of photograph processing methodologies and proposes huge pre-processing to obtain high type accuracy. Particularly, the chosen aggregate of 16 features sporting morphological and statistical statistics confirmed an outstanding capability to distinguish among cancerous and non-cancerous blood cells. We selected the maximum of the functions on the basis of their similarity with the visible statistics, on which the domain professional's consciousness at some stage in guide examination. Those features had been extracted from 241 WBCs segmented from 31 peripheral blood smear snapshots from a local dataset. To perform the category, we selected the two maximum famous classifiers inside the literature, the ANN and the SVM algorithm. The neural community version yielded higher effects, reaching a sensitivity of one hundred% and a standard accuracy of 97.52%. Unlike preceding studies, we additionally provided some of the unique classification probabilities of the efficiently diagnosed cells and carried out a reverse analysis to perceive the pivotal class disasters. These observations indicated that even when the published accuracies reach the best values, a category technique won't offer readability or sufficiently high reliability, and therefore, further examination is needed.

One of the greatest issues we encountered became a loss of scientific records and great datasets. In particular, expanding the mastering set of the records could reduce overfitting and grow the opportunity of unique classifications. Furthermore, the category mistakes because of incomplete datasets with missing cellular samples might be suppressed. It ought to be cited that many authors have validated their proposed structures by using small local and publicly unavailable datasets. Due to this fact, it was not possible to examine our findings with the effects received by the formerly proposed algorithms. Moreover, this has a bad effect on the possibility of reproducing recent tendencies and converging towards higher technical answers. The consequences acquired on these paintings imply that future research must be especially committed to the development of a much better segmentation set of rules with the possibility of adaptive parameter adjustment, which could unify the capability of the gadget below various situations. Furthermore, researchers should pay attention to enhancing particular category probabilities and minimising fake negative classifications. The sort of system may be then used as a medical support device that could facilitate manual examination and store brilliant time. The usage of the effects of specific classifications with a defined excessive choice restrict will allow us to gain higher identity reliability. Therefore, while the system may be helpful, cells with lower probability should still be examined by haematological experts.

FURTHER READING

Bast RC, Croe CM, Hait WN, Hong WK, Kufe DW, Piccart-Gebhart M, Pollock RE, Weichselbaum RR, Yang H, Holland JF (2016). Holland-Frei Cancer Medicine. Wiley. ISBN 978-1-118-93469-2.

Kleinsmith LJ (2006). Principles of cancer biology. Pearson Benjamin Cummings. ISBN 978-0-8053-4003-7.

Mukherjee, Siddhartha (2010). The Emperor of All Maladies: A Biography of Cancer. Simon & Schuster. ISBN 978-1-4391-0795-9. Retrieved 7 August 2013.

Pazdur R, Camphausen KA, Wagman LD, Hoskins WJ (2009). Cancer Management: A Multidisciplinary Approach. Cmp United Business Media. ISBN 978-1-891483-62-2. Cancer at Google Books. Archived from the original on 15 May 2009.

Schwab M (2008). Encyclopaedia of Cancer. Springer Science & Business Media. ISBN 978-3-540-36847-2.

Tannock I (2005). The basic science of oncology. McGraw-Hill Professional. ISBN 978-0-07-138774-3.

REFERENCES

https://www.cancer.net/navigating-cancer-care/cancer-basics/what-cancer

https://www.indiatoday.in/magazine/nation/story/20190211-beating-cancer-1443221-2019-02-01

https://www.researchgate.net/publication/335273056_Healthcare_in_India-_A_SWOT_analyses.