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Behavioral interventions towards knowledge and awareness of reproductive cancer care: A study on select Indians using an online survey

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Abstract:

BACKGROUND: The behavioral aspects of human beings influence the incidences of cancer cases directly and indirectly. The factors like positive thinking and motivation were found to change the behavior toward knowledge and awareness of cancer. The main objective of the study is to assess the knowledge and awareness of select Indians about reproductive cancer.

MATERIALS AND METHODS: The online survey method assessed various components of knowledge and awareness about reproductive cancer. A Google Form has been distributed through social media platforms such as e-mail, Instagram, Facebook, and WhatsApp. The coded data has been computed in SPSS (version 25) by IBM (USA) for the analysis. Univariate and bivariate data analysis has been drawn to justify the objective.

RESULTS: Nearly 68 percent of the respondents were aware of reproductive cancer. Among them, 17 percent know about cervical cancer, and 12.5 percent have awareness about breast cancer. Electronic and print media (41.2 percent) were major sources of information about reproductive cancer. Nearly 48 percent of respondents reported that multiple sexual partners and poor sexual hygiene were risk factors for reproductive cancer. Around 57 percent of respondents reported reproductive cancer is preventable, 59 percent knew about cancer screening, and 63.5 percent knew the treatment process. The gender of the respondents was associated (p -value = 0.002) with awareness of reproductive cancer. It has been found that there is a significant association between knowledge of screening tests and the treatment process of reproductive cancer. The marital status of respondents is strongly associated (p -value = 0.000) with the awareness of reproductive cancer.

CONCLUSION: The factors like knowledge of reproductive cancer and awareness proceed as an important role in cancer prevention. A gender-neutral cancer awareness program is needed to increase cancer awareness irrespective of marital status.

Keywords:

Adaptive behaviors, cervix cancer, early intervention, motivation

Introduction

Adopting a healthy and protective behavior is always recommended for low health risks and motivates patients to reduce risk. Behavior toward cancer and its preventive measures can influence cancer incidence and prevalence. Positive

behavior towards preventive measures plays an important role to exercise, such as screening and improving the chances of survival among reproductive cancer patients.^[1,2] Health education and attitude toward cancer risk can be predicted from the health-seeking behavior of patients.^[3,4] A behavioral, epidemiological study from

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Iran showed that adaptation to sunlight protection behavior reduces exposure to skin cancer.^[5,6] Behavior can predict the fear and anxiety of cancer consequences further, which leads to adopting the preventive strategy. It has also been found that the fear of cancer changes the behavior and perception of people.^[7] The behavioral and lifestyle interventions toward cancer screening and physician consultation can prevent cancer risk. So adoption of a healthier lifestyle such as foods, exercise, work, games, and the environments are the key to cancer prevention.^[8]

Knowledge is a powerful tool for the health-seeking behavior of people. It can change the intention for prevention adaptation. The patient can choose the appropriate treatment and screening test required for the risk reduction of reproductive cancer.^[9] Cancer is considered a common disease now, but the knowledge about the risk factors was found inadequate. Reproductive cancer is a fearful disease and very complex to understand.^[10] A study provided evidence that one-third of the world population has more possibilities to develop cancer. The fears rapidly spread and show the consequences among people.^[11] Reproductive cancer has been found as the most common tumor among reproductive organs. It is measured as one of the most important causes of death.^[12,13]

Evidence found that Indian women have less knowledge of reproductive cancers than the western world. The low educational status leads to less knowledge about causes of reproductive cancers, diagnosis facilities, and treatment availabilities.^[14] Awareness about reproductive cancer, public attentiveness program, and advancement of cancer screening has resulted in early diagnosis and detection of cancers. Most reproductive cancers are diagnosed in the advanced stages due to negligence and inadequate knowledge.^[15] Lack of knowledge on various preventive measures has led to cervical and ovarian cancers among women. Estimation shows that cervical cancer leads to 80 percent of death among women aged 45 years. Among them, the major deaths are occurring to those women who have not attended the screening facilities and have casual behavior toward reproductive system issues.^[16] Screening of cancer and the human papilloma virus (HPV) vaccine were found to be the most effective ways of cervical cancer prevention. Knowledge about early detection and risk reduction is critical for young Indian women.^[17]

A study found that those women knowing early detection have self-diagnosed and self-care for cancer prevention.^[18,19] The risk factors such as unhealthy diets, insufficient exercise, and consumption of narcotic products were responsible for the growth of cancer cases. Family history is a significant risk factor for breast

cancer, and a few women know the cancer susceptibility gene mutations.^[20] Heavy bleeding between menstrual periods, bleeding after sex or menopause, and suffering in pain during sex have been found as the signs and symptoms of cervical cancer.^[10] Knowledge of the risk factors and self-medication can improve women's health-seeking behavior.^[21]

Cancer awareness promotes early detection and good health-seeking behavior among people. The study estimated that cancer awareness and prevention are still lacking.^[22,23] Increasing information and awareness of these risk factors influences the behavior. Public awareness can facilitate recognizing personal risk perceptions and promote health-seeking behavior.^[24,25] Cancer awareness also promotes the healthier lifestyles of an individual of their choice. It can reduce the possibilities of rapid help-seeking behavior.^[26] Education is found as a key factor associated with awareness of cancer risk factors. Information and awareness about the importance of cancer diagnosis and health check-ups promote fewer incidences of cancer cases. It is promoted among women about breast self-examination, mammograms test, and clinical breast screening.^[27] It has been found that people's behaviors have changed regarding cancer prevention and the proportion of cancer screening at an early stage.^[28] Education, financial constraints, superstition, and myth are associated with low access to healthcare among cancer patients. In India, urban-rural variation and educational status determine the awareness of reproductive cancer among women.^[20] Social stigma is also associated with cancer awareness, especially among females with reproductive cancers. The health information and mass education increased better awareness of breast and oral cancer. The study recommends that mass education needs to strengthen the awareness of cervical cancer.^[20,27]

It has been seen that the behavior of human beings has a tremendous influence on exposure to risk factors of reproductive cancer. Hence, the awareness of reproductive cancer and related knowledge plays an important role in the life of an individual. It is paramount to assess the knowledge of individuals about risk factors, symptoms, diagnosis, and types of reproductive cancer for understanding cancer epidemiology and timely intervention.

As per the argument of the above literature, it has been found that awareness is a key factor in increasing reproductive cancer knowledge. The study was required to assess the knowledge and awareness of reproductive cancer. Behavior plays a vital role in gathering information about cancer prevention knowledge. Therefore, the study assesses the behavioral intervention toward reproductive knowledge and awareness.

Materials and Methods

Study design and setting

The study design is cross-sectional in nature. Mostly descriptive statistic has been used to understand the individual behavior toward reproductive cancer knowledge and awareness. The online survey method was adopted to assess various components of the study outcome.

Study participants and sampling

The study adopted a non-probability convenience sampling method by sending an online questionnaire among respondents. The survey question has been posted on social media platforms such as e-mail, Instagram, Facebook, and WhatsApp. Most of the questionnaire was forwarded in WhatsApp groups. It has been sent to approximately 2000 people from different heterogeneous age groups. However, only 200 (10 percent) respondents have properly completed the survey questionnaire. Around 8 percent of respondents did not complete or wrongly filled the questionnaire, which was excluded from the data analysis. The data were collected from December 2021 to March 2022. However, the questionnaire has been forwarded four times repetitively on the different social media platforms.

Data collection tool and technique

A Google Form has been constructed, including the demographic characteristics, respondents' knowledge, and awareness about reproductive cancers. Various determinants such as knowledge of screening facilities, reproductive cancer prevention, treatment process, screening facilities, and types of reproductive cancer have been assessed. The questionnaire also identified respondents' knowledge of symptoms and risk factors of reproductive cancer. The Google form has been distributed among peer groups and social medial platforms for their responses. WhatsApp groups were the major sources of data collection.

Analysis method

The coded data has been computed in SPSS (version 25) by IBM (USA) for the analysis. Univariate and bivariate data analysis has been drawn to fulfill the objective of the study. Respondents' demographic characteristics such as age, education, gender, religion, marital status, occupation, and place of residence have been considered to draw the conclusion of study objectives.

Ethical consideration

The approval for ethical clearance was taken from the University of Hyderabad ethics committee (UH/IEC/2021/2). Informed consent had been attached along with the questionnaire. Each participant has the right to withdraw or refuse to give information

at any time or for any question. The confidentiality and anonymity of information would be rigorously maintained.

Results

The research results explained the frequency and percentage distribution of respondents' demographic characteristics in Table 1. The age-wise distribution shows that half of the respondents were from 18 to 25 years, and 7.5 percent were above 36 years. The majority (53 percent) of the respondents were male. Regarding the respondent's religion, the majority (84 percent) were from the Hindu religious group. As per the educational status, the educational qualification of 88.5 percent of respondents was graduate and above. Nearly 70 percent of respondents were single/unmarried. The occupation-wise distribution shows that half of the respondents were students and 30.5 percent were employed. The majority (57.5 percent) of the respondents belonged to the urban area.

Knowledge about reproductive cancer

The respondent's knowledge about reproductive cancer is shown in Table 2. Awareness about reproductive cancer, knowledge of screening methods, knowledge of reproductive cancer prevention, and treatment process have been considered the respondent's knowledge of reproductive cancer. Around 68 percent of respondents are aware of reproductive cancer, and 59 percent know about reproductive screening facilities for reproductive cancer. Above 63 percent of respondents knew about the treatment process of reproductive cancer, and 57 percent knew about the prevention of reproductive cancer.

Table 1: Demographic characteristics of respondents

Variables	Coding Categories	Numbers	Frequency	Total <i>n</i>
Age	18-25 years	101	50.5	200
	26-35 years	84	42.0	
	36 years and above	15	7.5	
Gender	Male	106	53.0	200
	Female	94	47.0	
Religion	Hindu	168	84.0	200
	Muslim	13	9.5	
	Christian	19	6.5	
Education	12 th pass	23	11.5	200
	Graduation and above	177	88.5	
Marital status	Married	61	30.5	200
	Single/unmarried	139	69.5	
	Occupation	Student	100	
Employed	61	30.5		
Researcher	22	11.0		
Personal business	17	8.5		
Place of residences	Urban	115	57.5	200
	Rural	85	42.5	

Table 2: Respondent's knowledge about reproductive cancer

Demographic characteristics	Percentage of knowledge about reproductive cancer				Total (n)
	Awareness about Reproductive Cancer	Knowledge on Screening	Knowledge on RC prevention	Knowledge on treatment	
Age group					
18-25 years	71.3	58.4	51.5	66.4	101
26-35 years	64.3	58.3	63.1	63.1	84
36 years and above	66.7	66.7	60.0	60.0	15
Gender					
Male	58.5**	49.1**	56.6	52.8***	106
Female	78.7	70.2	57.4	75.5	94
Religion					
Christian	73.7	47.4	52.6	68.4	19
Hindu	67.3	61.3	58.9	63.7	168
Muslim	69.2	46.2	38.5	53.8	13
Education level					
12 th pass	82.6	60.9	56.5	69.6	23
Graduation and above	66.1	58.8	57.1	62.7	177
Marital status					
Married	45.9***	54.1	54.1	52.5*	61
Single/unmarried	77.7	61.2	58.3	68.3	139
Occupation					
Student	75.0	59.0	52.0	69.0	100
Employed	60.7	60.7	68.9	65.6	61
Researcher	68.2	54.5	54.5	50.0	22
Personal business	52.9	58.8	47.1	41.2	17
Place of residence					
Rural	67.1	55.3	50.6	57.6	115
Urban	68.7	61.7	61.7	67.8	85
Total	68.0	59.0	57.0	63.5	200

Significance level: *** $P < 0.01$, ** $P < 0.05$, * $P < 0.1$

Age-wise distributions show more respondents (71.3 percent) from the age group 18–25 years having more awareness about reproductive cancer as compared to the respondents from 25 to 36 years (64.3 percent) and above 36 years (66.7 percent). The majority (66.7 percent) of respondents above 36 years of age know about the screening facilities. The gender-wise distribution shows that females have more knowledge about reproductive cancer than male respondents. The majority of respondents from the Hindu religious groups have more knowledge on screening (61.3 percent) and prevention (58.9 percent) of reproductive cancer than Muslim and Christian religious groups. Similarly, the respondents from Christian religious groups have more awareness (73.7 percent) of reproductive cancer. Distribution of marital status found that unmarried women have more knowledge about reproductive cancers than the respondents getting married.

Similarly, the place of residents shows that respondents belonging to urban areas have more knowledge about reproductive cancer than the respondents from rural areas. The Chi-square analysis shows that the gender of the respondents was strongly associated with awareness about reproductive cancer, knowledge about

cancer screening, and the treatment process. The same association was also found between respondents' marital status and awareness of reproductive cancer.

Self-reported knowledge

Assessment of self-reported knowledge is explained in Table 3, and various types of reproductive cancer, symptoms, and risk factors are presented.

Nearly 17 percent of respondents know about cervical cancer. More than 16 percent of respondents have knowledge of cervical and ovarian cancer and breast, cervical, and ovarian cancer. Respondent's knowledge of prostate cancer was 2.9 percent, and testicular cancer was very low (2.2 percent). Nearly 53 percent of respondents reported heavy bleeding during menstruation and blood in urine as the early symptoms of reproductive cancer. Close to 48 percent of respondents reported that multiple sexual partners and poor sexual hygiene are the prominent risk factors for reproductive cancer. One-tenth of the respondents reported a history of sexually transmitted diseases (STDs), human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), and prolonged OCD (oral contraceptive drug used) as the risk factors for reproductive cancer.

Sources of reproductive cancer knowledge

The sources of reproductive cancer knowledge are presented in Figure 1. More than 41 percent of respondents got knowledge of reproductive cancer from electronic/print media. Health care professionals were the sources of knowledge for 30 percent of respondents. Nearly 12 percent of respondents learned about reproductive cancer from their friends and relatives.

Knowledge about screening facilities

Figure 2 shows the percentage distribution of respondents' knowledge about various cancer screening methods. Nearly one-fifth of the respondents reported Papanicolaou

test (PAP test) is the only screening method to detect reproductive cancer. A similar number of respondents also reported that computed tomography (CT) scans and blood tests could detect reproductive cancer. Nearly 19 percent of the respondents reported X-rays, CT scans, and magnetic resonance imaging (MRIs) together can detect reproductive cancer. More than 13 percent of respondents reported MRI, CT scan, and PAP test, 14.4 for the blood test and PAP test, and 8.5 percent for MRI and CT scan can only detect reproductive cancer. Nearly 6 percent of respondents reported that the Mantoux test and the PAP test can detect reproductive cancer.

Table 3: Self-reported knowledge on types, symptoms, and risk of reproductive cancer (n=136)

Variable	n	Percentage
Types of reproductive cancer		
Cervical cancer	23	16.9
Breast cancer	17	12.5
Ovarian/uterine cancer	14	10.3
Cervical and ovarian cancer	22	16.2
Breast, cervical, and ovarian cancer	22	16.2
Vaginal cancer	14	10.3
Penile cancer	9	6.6
Prostate cancer	4	2.9
Testicular cancer	3	2.2
Penile, prostate, and testicular cancer	8	5.9
Symptoms of RC		
Heavy bleeding between Menstrual Cycle (MC) and blood in the urine	72	52.9
Foul-smelling discharge and interrupted urine flow	43	31.6
High fever and abdominal swelling and pain	8	5.9
Discomfort while sitting	8	5.9
New onset of erectile dysfunction	5	3.7
Risk factors of RC		
Multiple sexual partners and poor sexual hygiene	65	47.8
Family history	41	30.1
History of STDs and HIV/AIDS	14	10.3
Prolonged OCD (oral contraceptive drug used)	14	10.3
Multiple pregnancies, delivery, and abortion	2	1.5

Knowledge of cancer treatment therapies

Figure 3 depicts the respondent's knowledge of reproductive cancer treatment therapy. Nearly 19 percent of respondents reported chemotherapy, and 21.3 percent reported drug therapy could be an effective treatment for reproductive cancer. Close to one-fourth of respondents reported radiotherapy as the treatment of reproductive cancer. More than 9 percent of respondents reported that surgery could be used for the treatment of reproductive cancer.

Awareness of various causes and risk reduction factors of reproductive cancer

Table 4 distributes the awareness of various causes and risk reduction factors of reproductive cancer. Nearly one-third (32 percent) of respondents do not have any knowledge or awareness about the causes of reproductive cancer. Approximately 22 percent of respondents knew that carcinogenic substances are the leading cause of reproductive cancer. Above 6 percent of respondents reported radiation and carcinogenic substances resulting in reproductive cancer.

One-fifth of the respondents reported that avoiding multiple sexual partners can reduce the risk of reproductive cancer, and 9 percent reported avoiding industrial and environmental toxins. Nearly one-fifth

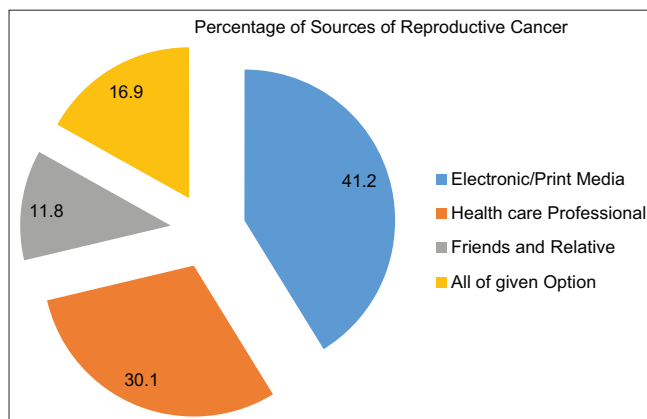


Figure 1: Sources of reproductive cancer knowledge (n = 136)

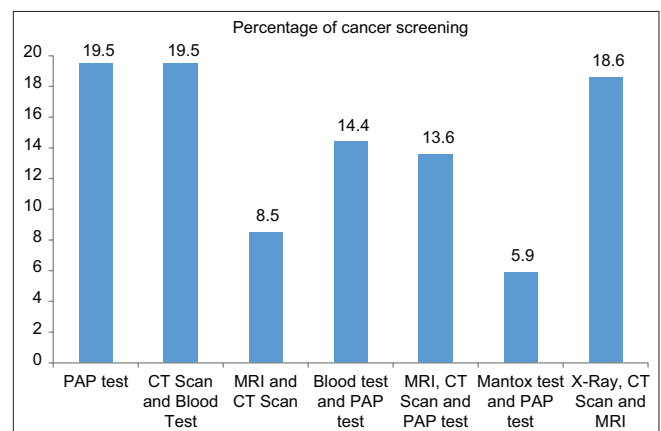
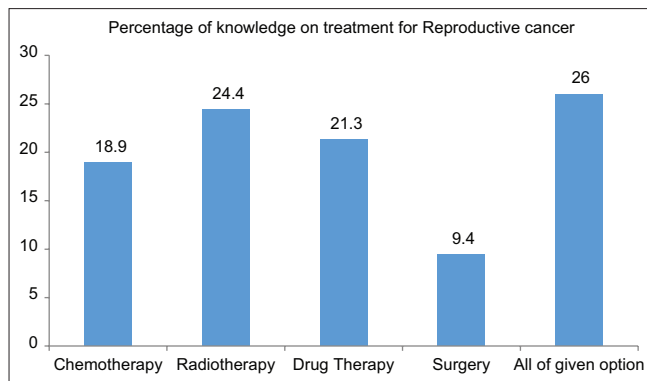


Figure 2: Percentage of knowledge about cancer screening facilities

Table 4: Awareness of various causes and risk reduction factors

Variable	n	Percentage
Causes of reproductive cancer		
Carcinogenic substances	44	22.0
Radiation and carcinogenic substances	13	6.5
Bacteria and lack of hygiene	23	11.5
Virus and bacteria	44	22.0
Lack of hygiene, carcinogenic substances, and contagious means	12	6.0
I do not know	64	32.0
Factors for risk reduction of reproductive cancer		
Avoid multiple sexual partner	40	20.0
Avoid industrial and environmental toxins	18	9.0
Maintain personal hygiene	9	4.5
Take care of food and maintain reproductive hygiene	39	19.5
Regular physical activities, maintain personal hygiene, and take care of food	10	5.0
Reproductive hygiene and avoid multiple sexual partner	35	17.5
I do not know	49	24.5

**Figure 3: Knowledge of cancer treatment therapies**

of the respondents do not know about risk reduction factors. More than 17 percent of respondents reported that factors like maintaining reproductive hygiene and avoiding multiple sexual partners could reduce the risk of reproductive cancer.

Discussion

Knowledge and awareness are essential factors for reproductive cancer care. The current study has found a significant relationship between knowledge, awareness, and reproductive cancer care. Lack of awareness about reproductive cancer promotes various risk factors responsible for the disease.^[29] The study found education of the respondents played a vital role in knowing about reproductive cancer. Cancer awareness and health-seeking behavior were found to be very less in many developing countries, including India. Health education and the casual behavior towards reproductive cancer treatments were responsible for cancer awareness.^[30,31] The study found that awareness of reproductive cancer has only 68 percent, and the knowledge of treatment-seeking behavior was 63 percent. The respondent's knowledge

about the most common causes of reproductive cancer was multiple sexual partners and poor sexual hygiene. Another study provides evidence that the family history indicates the common causes of cervical cancer.^[21] The factors like history of STD, HIV/AIDS, a prolonged oral contraceptive drug, multiple pregnancies, multiple deliveries, and frequent abortion are causes of reproductive cancer. A study has found the same, like the long use of the oral contraceptive pill, poor genital hygiene, and STDs as the risk of reproductive cancer. The study also found bleeding after sex and during sex, pain during sex, and bleeding after menopause as the possible causes of cervical cancer.^[31] This study argues that 57 percent of the respondents have some knowledge of reproductive cancer. A study found that 93 percent of respondents do not know about the signs and symptoms of reproductive cancer, and 96.4 percent were not aware of the prevention of reproductive cancer.^[32]

Screening is an essential preventive measure in the cancer control program. The present study determines that nearly one-fifth of the respondents know about PAP tests, CT screening, blood tests, MRI, etc., A study from Kolkata, India, found that 95 percent of the respondents do not have an essential awareness of the PAP test.^[33] The study found that knowledge about various screening methods can promote early diagnosis. Another study argues that available screening methods to the population are also not adequately utilized due to a lack of knowledge on reproductive cancer.^[34] This study determines electronics and print media as the primary sources of reproductive cancer knowledge. Evidence supported magazines, newspapers, and the internet are the major sources of knowledge for cancer screening modalities.^[21] Many studies argue that only mass media or social media are not enough to increase awareness of reproductive cancer. It is also proved that print and audiovisual documentaries, cancer

education, community-based program, awareness events, and friends were the sources of reproductive cancer knowledge.^[21,33,35,36] The present study found the health care provider as the second major source of reproductive cancer awareness. Similarly, the physician is an important source of knowledge about Pap smears in reproductive cancer.^[37]

Limitations and recommendation

The study was conducted during the corona virus disease (COVID-19) pandemic, so the data was collected through an online survey. Face-to-face communication with the targeted mass is lacking. The researcher could not probe the confounding factors responsible for the study outcomes. The study tool was designed for the educated mass, only those using social media platforms. The study is unable to reach the poor, uneducated mass. Hence, the future study can be conducted among a more representative population and in effective ways.

Conclusion

Reproductive cancer increases the burden of morbidity and mortality in India. Knowledge and awareness of reproductive cancer are significantly associated with risk factors, cancer symptoms, and screening tests. Increasing awareness through various cancer education programs, print, and social media can prevent cancer risk factors and benefit the early diagnosis. Creating awareness by health care providers makes an effort for cancer prevention and influences preventive behavior towards cancer care.

More efforts are needed to find such gaps of lacking knowledge on reproductive cancers, cancer care services, and utilization. Understanding the preventive attitude of people towards cancer screening can make a positive impact on reproductive cancer care. More awareness about reproductive cancers and screening facilities will help diagnose more and ensue treatment for a better outcome.

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Conflicts of interest

There are no conflicts of interest.

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