Knowledge of Breast Cancer and the Practice of Breast Self-Examination in Saudi Women: An Online Survey

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Abstract

Breast cancer is a cancer that spreads all over the world, including Saudi Arabia. Early detection requires awareness and knowledge of possible warning signs and effective methods of examination. The study aimed to evaluate the breast cancer knowledge (risk factors, causes, prevention and treatment) and to assess the Breast Self-Examination (BSE) among women in Saudi Arabia, so as to explore possible correlation between education and knowledge and practice of breast cancer. A total of 697 Saudi women, their ages between 18 and 65 years, their education levels ranged from primary to graduate levels. A custom designed survey was distributed online to assess the knowledge of breast cancer across many domains, the practice of BSE and women's psychology towards this disease. The study period was from September to December 2019. Almost half of the participants had an overall moderate knowledge level (48.7 ± 17.2%) toward breast cancer. As the education level of the participants increased, knowledge also increased at $P<0.0001$. Knowledge score correlated with education ($r2 = 0.27$, $P<0.0001$). Knowledge scores across risk factors ranged between (10.1 - 69.3%) while knowledge levels across the other tested domains (causes, spreading, BSE, prevention and treatment) varied between (9.1 - 95.4%). The studied women also showed a moderate level of BSE practice (58.0 ± 29.9%) and significantly associated with education ($P<0.05$). The breast cancer knowledge of the participants was found to be moderate among women in Saudi Arabia and was higher with the increasing level of tertiary education. Since few women in this study (11.9%) had goodbreast cancer knowledge, there is a need to introduce breast cancer education in focusing on less educated women.

Keywords: Breast Cancer, Breast Self-Examination, Knowledge, Practice, Retrospective Cohort Study

1. Introduction

Breast cancer is a disease that affects breast cells, accounting for 25.1% of all cancers[1]. In the Arabic gulf countries, breast cancer has the highest incidence rates in Bahrain (49.8/100,000), while the incidence in Saudi Arabia is (22.4/100,00)[2].

Breast cancer must be diagnosed early in order to improve the chance of successful treatment[3]. Early detection requires knowledge and awareness of warning signs and

methods of examination[2-4]. Screening methods include clinical breast examination, Breast Self-Examination (BSE) and mammography[5].

Although early diagnosis is important, studies have shown that a low percentage of women regularly perform the BSE[6-7]. This may be due to a lack of adequate breast cancer knowledge, its risk factors, signs and the importance of BSE and mammography[2-8].

The study aims to enlighten the public in general and the female population in Saudi Arabia, regarding the evaluation of breast cancer knowledge (risk factors, causes, prevention and treatment) and assessing the BSE among Saudi women for the purpose of exploring the possible correlation which may exist between education and knowledge and practice of breast cancer. The study further aimed at understanding the psychology of women about the reasons that prevent them from doing early breast examination.

2. Subjects and Methodology

The survey was conducted among Saudi females from the ages of 18 to 65 years old, during September to December 2019. A total of 697 female participants completed an online, custom-made survey. Ethical approval was granted and approved by the Research Unit, Batterjee Medical College, Jeddah, Saudi Arabia.

A survey consisting of 30 items which was designed and developed from previously conducted studies[7,9–11], which was tested for content validity and reliability was calculated at 0.95. The survey collected data on socio-demographics, knowledge and practice.

Twenty-one items were developed for the purpose of assessing the knowledge of breastcanceron various domains which included the following: The disease risk factors [gender (1 item), aging (1 item), genetics (1 item), smoking (1 item), diet and obesity (1 item), sport (1item), childbearing (1 item) and hormonal activity (3 items)], as well as causes (3items), spreading (2 items), BSE (2 items), prevention (2 items) and treatment (2 items). Responses were designated a Likert-type options as follows: "Agree," "disagree" and "do not know". Represented numerical values were created by assigning a score of "1" to each correct answer and a score of "zero" to the responses which were incorrect or undecided. The total sum of collected correct responses was in the range of 0-21 and the knowledge level was divided into 3 categories: Poor (0-7 correct answers, 0-33.3%), Average (8-14 correct answers, 33.4-66.7%), Good (15-21 correct answers, 66.8-100%).

BSE practice was evaluated by asking 5 items. A practice score was applied with assigning a reflective score of "1" to each correct answer and a score of "zero" to other responses with a maximum possible score of 5. The practice of the study participants was assessed using the sum score of all items and categorized into 3 levels: Poor (0-33.3%), Average (33.4-66.7%), Good (66.8-100%).

Psychology of breast cancer was assessed by one item "what are the reasons that prevent some women from doing early breast tissue examination?"

2.1 Statistical Data Analysis.

The primary gathered data was analysed using the IBM SPSS Statistics®software package Ver. 23. The descriptive statistical analyses were reported and represented in frequencies and percentages tables. ANOVA was utilisedto identify any possible statistically significant differences between the educational level. Pearson's correlation coefficient was calculated to define the relationship between education and breast cancer knowledge and BSE practice. The calculated p-values of <0.05 indicated statistically significant differences between the measured variables.

3. Results

3.1 Participants

A total of 697 Saudi women completed the online survey, their ages between 18-65 years. Most of the participant women were in the age group 35-44 years (n=221; 31.9%); the majority had a university education level (n=475; 68.4%) and married with children (n=482; 69.9%), Table 1.

3.2 Knowledge of Breast Cancer

The overall knowledge level was moderate with nearly half of the participants (48.7 ± 17.2%) towards breast cancer (n= 456, 65.4%, Table 2A).

As the level of education increased, knowledge also increased - Primary schools (25.7 ± 8.8%), Intermediate school(36.6±17.7%), High school (45.6±17.8%), University (49.5±16.4%) and Post-graduatelevel (56.5±16.6%), P<0.0001, as highlighted in Table 2B. The calculated correlations were both moderate as well as significant when the scores of knowledge and education were compared (r2 = 0.27), P<0.0001. There was no difference between knowledge level and women's age or their material status.

Table 1. Demographic characteristics of the participating women

Demographic characteristics		N	%
Age (years)	18 - 24	101	14.6
	25 - 34	137	19.8
	35 - 44	221	31.9
	45 - 54	162	23.4
	55 - 64	62	8.9
	≥ 65	10	1.4
Education Levels	Primary school	10	1.4
	Intermediate school	31	4.5
	High school	109	15.7
	University	475	68.4
	Postgraduate level	69	9.9
Marital Status	Single	133	19.3
	Married (with children)	482	69.9
	Married (without children)	31	4.5
	Divorced (without children)	8	1.2
	Divorced (with children	36	5.2

3.3 Knowledge of Risk Factors

Gender, aging, genetics, smoking, diet, obesity, sport, child bearing and hormonal effectsfor breast cancer are reported in Table 3. The percentage of women who were aware of the risk factors for breast cancer was estimated between (10.1-69.3%). Women with higher education leveltended to be greater knowledgeable of risk factors such as age at (P<0.0001), genetic reasons (P<0.0001), diet and obesity (P<0.01), sport (P<0.001) and hormonal effects(P<0.05).

The percentage of women who realized the other aspects of breast cancer such as causes, spreading, BSE, prevention and treatment of breast cancer was estimated between (9.1-95.4%). Knowledge related to these domains is presented in Table 4. As before, women with higher educationlevel were generally better knowledge, particularly in terms of causes (P<0.01), BSE (P<0.05) and treatment (P<0.01).

Table 2. Knowledge of breast cancer among women

A) Overall Knowledge		Mean ±SD
Overall Knowledge		48.7 ± 17.2%
Knowledge Level (n=697)		
Poor (0-33.3%)		158 (22.7 %)
Moderate (33.4-66.7%)		456(65.4 %)
Good (66.8-100%)		83 (11.9 %)

B) By Demographic characteristics		Mean ± SD	P-value#
Age (years)	18 - 24	49.9 ± 15.9 %	0.380
	25 - 34	49.3 ± 16.6 %	
	35 - 44	47.2 ± 18.0 %	
	45 - 54	51.4 ± 16.6 %	
	55 - 64	46.2 ± 17.2 %	
	≥ 65	38.6 ± 24.1 %	
Education Levels	Primary school	25.7 ± 8.8 %	0.0001***
	Intermediate school	36.6 ± 17.7 %	
	High school	45.6 ± 17.8 %	
	University	49.5 ± 16.4 %	
	Postgraduate level	56.5 ± 16.6 %	
Marital Status	Single	48.7 ± 16.2 %	0.282
	Married (with children)	49.7 ± 17.2 %	
	Married (without children)	47.3 ± 21.7 %	
	Divorced (without children)	50.0 ± 11.9 %	
	Divorced (with children	44.9 ± 18.3 %	

The percentage of overall knowledge is presented as (mean ± SD); #Bivariate correlation at ***P<0.001

Table 3. Correct knowledge of risk factors for breast cancer by A) Overall and B) Educational level

Risk Factors	Item Asked	A	B						p-value#
		Overall (n=697)	Education Level						
			Primary (n= 10)	Intermediate (n=31)	High School (n= 109)	University (n= 475)	Postgraduate (n= 69)		
Gender	The fact that you are a female comes first as a risk factor for developing breast cancer.	419 (60.2%)	4 (40%)	13 (41.9%)	62 (56.9%)	249 (61.9%)	44 (63.8%)		0.114
Aging	The more a person gets older, the higher the incidence of breast cancer.	393 (56.6%)	1 (10%)	7 (22.6%)	56 (51.4%)	283 (59.6%)	45 (65.2%)		0.0001***
Genetics	Having a family member with breast cancer is a risk factor for developing it.	481 (69.3%)	2 (20%)	8 (25.8%)	67 (61.5%)	342 (72%)	60 (87%)		0.0001***
Smoking	Smoking is a catalyst for breast cancer.	430 (61.8%)	3 (30%)	19 (61.3%)	65 (59.6%)	294 (61.9%)	47 (68.1%)		0.234
Diet and Obesity	Eat foods high in fat and obesity related to breast cancer.	334 (48.1%)	3 (30%)	13 (41.9%)	40 (36.7%)	233 (49.1%)	44 (63.8%)		0.006**
Sport	Lack of movement and lack of exercise stimulates breast cancer.	319 (45.8%)	3 (30%)	14 (45.2%)	37 (33.9%)	218 (45.9%)	45 (65.2%)		0.001***
Childbearing	Childbearing after the age of 35 is a trigger factor for breast cancer.	70 (10.1%)	0 (0%)	4 (12.9%)	7 (16.4%)	50 (10.5%)	9 (13%)		0.437
	Menopause after the age of 55 is a risk factor for developing breast cancer.	133 (19.2%)	0 (0%)	4 (12.9%)	13 (11.9%)	97 (20.4%)	19 (27.5)		0.033*
Hormonal Effects	Taking long-term birth control pills for breast cancer.	315 (45.2%)	0 (0%)	9 (29%)	44 (40.4%)	224 (47.2%)	37 (53.6%)		0.004**
	Taking female hormones after a prolonged menopause from breast cancer causes.	236 (33.9%)	0 (0%)	4 (12.9%)	35 (32.1%)	167 (35.2%)	29 (42%)		0.008**

Data is presented as the number(%) correctly answering each item.#ANOVA; *P <0.05; **P< 0.01;***P<0.001.

Table 4. Correct knowledge of other aspects of breast cancer by A) Overall and B) Educational level

Domains	Item Asked	A	B					p-value[#]
		Overall (n=697)	Education Level					
			Primary (n= 10)	Intermediate (n=31)	High School (n= 109)	University (n= 475)	Postgraduate (n= 69)	
	Early puberty for girls (12 years ago) is considered one of the causes of breast cancer.	63 (9.1%)	0 (0%)	3 (9.7%)	8 (7.3%)	42 (8.8%)	10 (14.5%)	0.401
Causes	Not having children at all is one of the main causes of breast cancer.	105 (15.1%)	0 (0%)	5 (16.1%)	15 (13.8%)	64 (13.5%)	21 (30.4%)	0.003**
	Exposure to a large proportion of radiation from the etiology of breast cancer.	495 (71.2)	2 (20%)	17 (54.8%)	75 (68.8%)	343 (72.2%)	56 (81.2%)	0.0001***
Spreading	Breast cancer is a noninfectious disease.	649 (93.1%)	8 (80%)	27 (87.1)	103 (94.5%)	444 (93.5)	64 (92.8%)	0.305
	Breast cancer cannot be transmitted or spread to the rest of the body.	75 (10.8%)	2 (20%)	4 (12.9%)	19 (17.4%)	45 (9.5%)	5 (7.2%)	0.099
Breast Self-Examination	The best time to perform self-examination is the week after the period ends.	401 (57.8%)	4 (40%)	11 (35.5%)	57 (52.3%)	281 (59.2%)	45 (65.2%)	0.037*
	Breast Self-Examination should begin at age after puberty	116 (16.7 %)	-	3 (10%)	22 (20.2%)	80 (16.9%)	10 (14.5%)	0.027*
	Early detection of breast cancer achieves a high rate of recovery and prevention.	663 (95.4%)	10 (100%)	28 (90.3%)	102 (93.6%)	454 (95.6%)	66 (95.7%)	0.782
Prevention	Menopause women should start yearly screening mammograms.	348 (50.0%)	2 (20%)	12 (38.7%)	56 (51.4%)	237 (49.9%)	39 (56.5%)	0.196
	Full or part of mastectomy is not the only treatment for breast cancer.	470 (67.7%)	3 (30%)	10 (32.3%)	69 (63.3%)	327 (68.8%)	60 (87%)	0.0001***
Treatment	Treatment varies according to the stage in which the cancer was discovered.	615 (88.5%)	7 (70%)	23 (74.2%)	93 (85.3%)	425 (89.5%)	64 (92.8%)	0.01**

Data is presented as the number (%) correctly answering each item. #ANOVA; *P <0.05; **P< 0.01; ***P<0.001.

3.4 Practice of BSE

The studied women showed a moderate level of BSE practice (58.0 ± 29.9%). The BSE practices were presented in Table 5.

There were 69.6% of participants knowing how to do a self-examination to detect the beginnings of breast cancer and most of these women had a high educational level (P<0.05). Almost half of the women 57.8% answered that the most appropriate time to do a self-examination is after the menstrual cycle ends, 51.1% of women correctly determined that it is ideal to do BSE once a month and 49.9% were aware that postmenopausal women should perform a mammogram once a year. 62% of the participants agreed that national recommendations for mammography screening of women at the age of forty in Saudi Arabia. As previously mentioned education showed a significant difference in the BSE performance of women with a higher education level (P<0.05, Table 5).

Table 5. Breast cancer practice by A) Overall and B) educational level

Breast Self-Examination (BSE)	A	B					p-value#
	Overall (n=697)	Education Level					
		Primary (n= 10)	Intermediate (n=31)	High School (n= 109)	University (n= 475)	Postgraduate (n= 69)	
The participant knows how to do a self-examination to detect the beginnings of breast cancer	484 (69.6 %)	5 (50 %)	20 (64.5 %)	68 (62.4 %)	330 (69.8 %)	58 (84.1 %)	0.020*
The best time to do a self-examination is after the menstrual cycle ends	401 (57.8 %)	4 (40%)	11 (36.7 %)	57 (52.3 %)	281 (59.4 %)	45 (65.2 %)	0.039*
The participant does a breast self-exam once a month	356 (51.1 %)	5 (50%)	8 (26.7%)	42 (38.5%)	261 (54.9 %)	39 (56.5 %)	0.006**
In Saudi Arabia, national recommendations for mammography screening of women at the age of 40	431 (62 %)	1 (10%)	13 (43.3 %)	62 (56.9 %)	300 (63.3 %)	52 (75.4 %)	0.0001***
After menopause, women should do a mammogram once a year	348 (49.9%)	2 (20%)	12 (40%)	56 (51.4%)	237 (49.9%)	39 (56.5%)	0.032*

Data is presented as the number (%) correctly answering each item. #ANOVA; *P <0.05; **P< 0.01; ***P<0.001.

3.5 Psychology of Brest Cancer

Psychology of breast cancer was evaluated by asking women about the reasons that prevent them from doing early breast tissue examination. The majority answered that they did not know the importance of early screening (n= 293, 42.3%) and some answered that the reason was their fear of breast cancer (n= 206, 29.7%), as well as severe pain caused by mammography (n= 99, 14.3%), while some women had no known cause (n= 95, 13.7%), Figure 1.

- ■ Severe pain caused by the mammograph
- ■ Fear of breast cancer
- ■ Not knowing the importance of early examination
- ■ I do not know
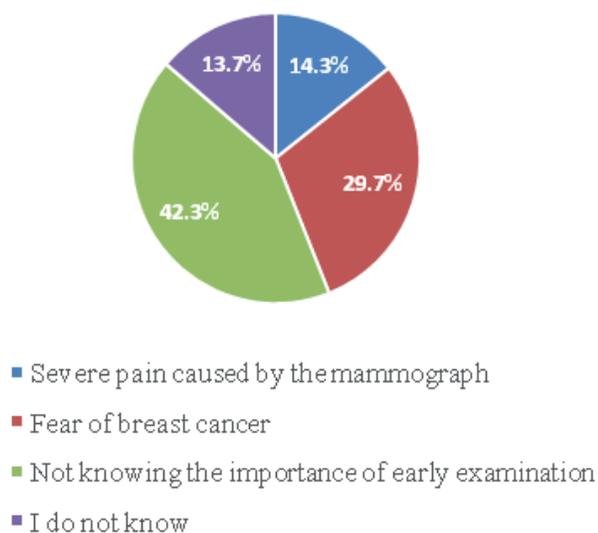
Women reported their psychological reasons for breast cancer; Majority of women did not know the importance of early examination.

Figure 1. The reasons prevent women from doing early breast tissue examination.

4. Discussion

Breast cancer disease is considered one of the most common types of cancer around the world [7-12] as well as in Saudi Arabia[6-13] .This study was conducted in Saudi Arabia where breast cancer is prevalent and accounts for 24% of all women cancer cases diagnosed in Saudi Arabia each year[9]. Early detection of breast cancer saves lives, as poor awareness of the early detection may lead to a delay the diagnosis and thus, it will have an adverse effect on survival[9]. Thus, breast cancer knowledge and the practice of BSE among women are very important for the prevention of breast cancer[7].

Empowering society, especially women, is an essential step towards further progress on health issues. This is achieved by enabling women to obtain health education and knowledge[9]. Therefore, this study evaluated the knowledge of breast cancer among Saudi women with respect to education impact (ranging from primary education to postgraduate studies).

The present study showed that majority of women (65.4%) had a moderate overall knowledge (48.7%). This is agree with results from studies in Egypt (60%)[14], Malaysia (53.5%)[5] and Iran (43%)[11], with other studies in Saudi Arabia documenting in Riyadh (51.6%)[13], Abha (˜50%)[15] and Madinah (38.1%)[16].

In the current study, we found that there was a correlation between acquiring better knowledge of the disease and the higher educational level (postgraduate studies), P< 0.0001. This result was similar with those found by previous researchers in Malaysia[5] and Saudi Arabia[9]. These researchers found that educational levels have higher knowledge on breast cancer. Educational level indicates more knowledge[9].

Knowledge relating to breast cancer risk factors was investigated in this study. Knowledge scores across risk factors ranged between (10.1- 69.3%). The most widely known risk factors by the current participants were having a family member with breast cancer (69.3%)and being a female (60.2%). However, knowledge of other risk factors of breast cancer was limited as only (19.2%) knew that menopause after the age of 55 is a risk factor while (10.1%) for childbearing after the age of 35 years as a risk factor. These results are nearly similar to a study conducted by Eldessouki et al.[7] on 89 Egyptian female administrative employees working in a medical college shown that 92.6% knew about being a woman and 53.7% recorded having a close relative with breast cancer as risk factors for breast cancer and the knowledge about other risk factors for this disease was limited such as the late menopause (18.5%) and early menarche (17.0%)). These results are also consistent with a study conductedin Jeddah, Saudi Arabia by Radi[17] who found that 200 Saudi women knew the risk factors of breast cancer as (family history (57.5%), menopausal delay (18.5%) and early menstruation (17.0%)). The most obvious explanation is that in local culture, there is a common understanding that the features and disease of breast cancer are always associated with females and spread in families with breast cancer[7]. These results illustrate areas of knowledge where more focus should be placed.

In this study, knowledge regarding smoking as a risk factor was recognized as (61.8%) of the participated women. Similarly, smoking was correct choice as a risk

factor for (62.8%) women living in Riyadh, Saudi Arabia[13]. Knowledge of taking birth control pills as a risk factor for breast cancer was (45.2%). This is similar to two Saudi studies: Madinah (42%)[16] and Riyadh (41%)[13].

This study shows that childbearing after the age of 35 is a trigger factor for breast cancer by only (10.1%) of the women. This corresponds to a similar study conducted in Riyadh, Saudi Arabia (24%)[13]. This finding might be explained by the perception that the acquisition of more information regarding cancer will be more enhanced when interacting with breast cancer patient[13].

Interestingly, knowledge levels across the tested domains (causes, spreading, BSE, prevention and treatment) varied between (9.1 - 95.4%), with moderate knowledge of breast cancer.

Concerning the causes of breast cancer, 71% of women knew that the cause was exposure to a large proportion of radiation, 15% knew that one of the causes not having children at all, and 9.1% knew the cause as early puberty of girls (before 12 years). Similar findings were found in Albargi et al[2] study that identified causes were radiation to the breast (65%) and early puberty (15%).

As for the knowledge related to BSE, it was shown in this study that participants had poor to moderate knowledge. 57.8% knew the best time to perform a self-examination is the week after the period ends and 16.7% knew that BSE should begin at age after puberty.This outcome is reflecting reasonable knowledge about mammography[2].

Regarding prevention and treatment, this study found that most participants knew the correct information (50-95.4%). 67.7% of participants knew that mastectomy is not the only treatment for breast cancer where similar outcome was reported in a previous study in Malaysia (66.0%)5. 95.4% of women knew that early detection of breast cancer achieves a high rate of recovery and prevention. Knowledge on breast cancer among women is important in order to seek early care and to increase there cognition of cancer in its early stage[5]. Cultural beliefs and attitudes also influence the stage in which breast cancer is diagnosed[18].

Early detection tools for breast cancer include clinical breast examination, Breast Self-Examination (BSE) and mammography[9]. These tools are the only methods used[8]. In this assessment of womenpractice, they knew how to do self-examination to detect the beginnings of breast cancer (69.6%). This is similar to what has been reported in a study conducted in Brazil where more than 79% of the participants reported performing BSE and this is due to that the awareness about breast cancer[19].BSE provides a proper method for early discovery of breast tumours, thus knowledge and regular practice could protect women from serious morbidity and mortality due to breast cancer[7]and this is very promising result about the level of awareness. Moreover, screening behaviour was found to be influenced by level of knowledge and perceived risk factor among women[5]. In fact, regular BSE has been suggested as a part of the overall breast health promotion concept[20].

As for the practices related to Breast Self-Examination, it was shown in this study that 57.8% of women do the BSE after the menstrual cycle ending. 51.1% of participants do the BSE once a month. 49.9% do a mammogram once a year after menopause. These findings can be explained by increased emphasis of breast cancer awareness in health campaigns that happened with time[2].

One of our aims was to understand the psyche of women about the reasons that prevent them from doing early breast tissue examination. The majority answered that they did not know the importance of early screening (42.3%) and also their fear of breast cancer (29.7%) as well as severe pain caused by mammography (14.3%), while some women had no known cause (13.7%). The reasons of BSE barrier were reported in previous studies[9,20]. One reason was that women avoid knowing that she has cancer because this might lose her husband's support or suffer being abandoned by her husband or she might prevent marriage proposals to her daughters (assumed heredity)[9]. Another reason that women (68.8%) were not convinced of the usefulness of BSE[20]. Some still think a diagnosis of breast cancer is a death sentence and a taboo[9].

The limitations of this study were its cross-sectional and pilot settings, as well as, the randomization in selecting the sample, as it is not guaranteed that all participants who answered the online survey will be from all regions of Saudi Arabia.

5. Conclusion

The study concludes that the level of knowledge of breast cancer disease is evidently moderate among women in Saudi Arabia. Furthermore, the level of this knowledge was found to be higher with increasing years of tertiary education. Since few women in this study (11.9%) had a good knowledge of breast cancer, there is a need to introduce breast cancer education in focusing on less educated women.

It can be also concluded from the study results that women are more knowledgeable about prevention and treatment domains more than other domains such as risk factors, causes and BSE. Women seem tobe applying the treatment methods than understanding the nature of the disease.

Breast cancer awareness-raising program and early detection methods should be strengthened, especially knowledge about Breast Self-Examination and corrected performance methods. Primary health care workers, media, television and social media should be involved in such educational programs.

6. Conflict of Interest

Authors declare that they have no conflict of interest.

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