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# Quality of Life Factor as Breast Cancer Risks

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## ORIGINAL PAPER

### ABSTRACT

**Background:** Numerous studies have observed risk factors for breast cancer. We investigated the association between quality life factors as breast cancer risks in a case-control study in industrial Zenica- Doboř Canton in Bosnia and Herzegovina. **Methods:** The case-control study was included 200 women, 100 without (control subjects) and 100 women with diagnosed breast cancer. We used questionnaires about breast cancer risks“ as study tool. Logistic regression was used to compute odds ratios (ORs) and 95% confidence intervals (CI) and a full assessment of confounding was included in analysis. **Results:** Breast cancer was positive associated with increasing age of life (from 45 years and more; OR= 1.25); further relative breast cancer history (OR= 4.42; 95%CI, 0.483-4.043); exposure to CT (OR=2.02; 95%CI, 1,254-3.261); never birth child (OR= 1.394; 95%CI, 0.808-2,407); used replacement hormonal therapy (OR= 1.826; 95%CI, 1.637-10.590); arrival time of menstruation (OR=2.651; 95%CI, 1.303-1.571); length of smoking status (OR=1.534; 95%CI, 0.756-3.098), alcohol consumption (OR=1.728; 95% CI, 0.396-7.533); exposure to CT per year ( $p=0.009$ ), routine physical inactivity ( $p=0.009$ ) and replacement hormones treatment ( $p=0.036$ ). **Conclusion:** Inverse associations of breast cancer and poverty, arrival time of menopause were observed. The link between breast cancer and a distant-cousin- degree family history of breast cancer was inverse association with breast cancer too. These results provide further evidence that, for most women, physical activity may reduce the risk of invasive breast cancer.

**Key words :** breast cancer, environmental factors, occupational risks, quality life style risks.

## 1. INTRODUCTION

According to World Health Organisation (WHO) data every twelfth women, or 8 % of women are affected by breast cancer. Fortunately, the mortality rate hangs behind in comparison to the number of affected thanks to the risk prevention, promotive activities of the health sector, government sector and individual activities (1, 2). Along with today's known facts, in 85-90 % of cases etiology of breast cancer remains unknown, even though it is considered that the leading role has the environmental factor and that they are important for 75 % cases of breast cancer genesis (3, 4, 5).

Breast cancer incidence has the growing trend with the increase of the maternal age, it doubles every ten years till menopause, and then it grows really slowly. It is extremely rare with women younger than twenty, but with women at the age of eighty 200-300/100 000 gets affected by breast cancer (1). Solely 0,8% of breast cancer evolves with women younger than 30 years old, and approximately 6.5 % occurs with women between 30 and 40 years old (1, 2, 3, 4).

Recent study in USA and China showed that obesity in combination with insufficient physical activity increases

the risk for breast cancer evolution (5, 6). It is specifically expressed with postmenopausal women. It is considered that insufficient consumption of calories intake is a cause of weight gaining and that is direct consequence for the impact on the growth hormone and estrogens hormone that is tightly connected to breast cancer incidence increase (7).

Obesity, by itself, is a breast cancer risk factor because it leads to the concentration increase of the endogenous estrogene (8). In the UK, 8 % of cases are connected to the overweight (BMI 26-30) and obesity (BMI>30) (9, 10, 11, 12, 13). Breast cancer incidence is higher with women who are of a better socioeconomical status and with higher education. Women who live in urban surroundings are more likely to get affected by breast cancer than the ones who live in rural areas (12, 13, 14, 15).

The aim of the study is to examine the factors of the quality of life as a risk for increasing breast cancer with women in central, industrial Zenica Doboř Canton in BiH, a developing country.

## 2. METHODS

A case control study conducted by polls has its purpose to research the connections between the individual and quality of life factors as breast cancer risks with women who are treating at family medicine centers in Ze-Do Canton. This research encompassed two hundred women, among which, one hundred women diagnosed with breast cancer according to clinical features (experimental group) and one hundred examinees who are not diagnosed with breast cancer or any other malignant diseases, but who take up preventive ultrasonography examination with general practitioner with aim of prevention, early detection and screening breast cancer (chosen practitioner did ultrasonic breast examination along with clinical examination). Examinees from the experimental group were diagnosed with breast cancer in the period from January the 1st 2003 till December 31st 2007. The diagnosis was confirmed based on the clinical examination, ultrasonographic breast examination, mamography and pathohistologically confirmed biopsy diagnosis or during the operative treatment 'ex tempora'.

### 2.1. Sample of female respondents

Selection of the examinees depended on the assent of the examinee in order to participate into the study, and as well on the breast cancer patient's general condition which had depended on the severity of the clinical features. Patients from the experimental group in the terminal phase of the disease along with patients with benign breast tumors and as well clinically unsecured breast cancer diagnosis were not encompassed with the sampling. All examinees were stratified according to: the age, occupation/working place e.g. (housewives, retired persons, teachers, health workers, administration workers, workers in manufacturing and last but not least examinees employed in the service industry; Body Mass Index BMI, employment/secure existence; wealth status and place of living (City, countryside, or near the industrial facilities).

### 2.2. Questionnaire Items and Measures

The research has been conducted on survey method, and the instrument of the research was a questionnaire specially made for this research: 'The questionnaire about breast cancer risks' came into existence based on the experience of evidence based medicine. Prior to research accession, examinees were put through a short education and they were provided with necessary information about the aims and the purpose of the research. Filling in the questionnaire met the conditions of ethical anonymity. The questionnaire holds a group of questions about individual and demographic data (age, education, occupation, employment, place of living, wealth status, satisfaction with the wealth status); in addition, place of living is categorized to urban, rural areas or somewhere near the industrial facilities; the wealth status is categorized from one (the best of all) to seven (the worst of all); the perception of satisfaction with wealth status is categorized from one (very much satisfied) to five (unsatisfied); and in distinction to previous data, breast cancer history within a family is researched separately. The following group of questions is about menarche and the reproduction that deals with giving birth (whether there was a childbirth,

and if yes how many and at which age); if there was a miscarriage and if positive how many; whether the examinee had breast fed, if positive how many children and for how long; did the examinee use contraception, and for how long; did she use hormone therapy and for how long; was there a menopause and when it had happened; did she use hormone replacement therapy? The following questions deal with breast cancer types (cystical formation, atypical hyperplasia, carcinoma in situ, previous forms of carcinoma etc.). The following set of questions deals with the way of living, about the exposition to stress (was the examinee exposed to stress, for how long and how often); physical activity (is she active, and how much); smoking habits (Is she smoking? If yes, for how long, how many cigarettes she smokes per day? Is she an ex smoker and when did she gave up smoking? Do any family members smoke? Is the examinee surrounded by smokers and If yes, how many hours?), also questions on alcohol consumption (Does she drink alcohol, how much and for how long?) (16, 17, 18, 19, 20).

### 2.3. Data Analysis

When it comes to statistic analysis, standard methods of descriptive statistics were used (central tendency measures and dispersion measures). In favour of testing differences of statistical significance, among the samples parametric and non-parametric significance tests were used. ( $\chi^2$  test, Mann-Whitney z-test). For linear correlation analysis a Tukey test is used (ANOVA). But for multivariate correlation analysis we used ANOVA (Logistic Regression Analysis). The odds for significant differences (Odds Ratio- OR; statistical significant OR > 1.0) were on 95 % confidential interval (95 % Confidence interval). Statistical hypotheses were tested on the significance level  $p < 0.05$ . Data analysis was performed using SPSS version 19.0.

## 3. RESULTS

The biggest number of examinees are in the age group above 45 years old. Namely in both groups, the experimental one with 83 % breast cancer and 79 % in the control group without cancer. In comparison to control subject poorer wealth status have the examinees diagnosed with breast cancer. We have discovered significantly lower representation of secure personal existence through employment and statistically significant difference of the examinees of the experimental group for ( $\chi^2 13.15$ ,  $P = 0.004$ ) category. Body Mass Index reveals unhealthy approach to personal health improvement and unhealthy diet for 71 % of examinees with breast cancer. It shows that 63 % of the examinees are overweight or obese ( $\chi^2 = 1.95$ ,  $P = 0.749$ ). When we analyse physical activity as a factor of healthy way of living, we can say that 70 % of patients in both groups does not practice it. The genesis of menopause came earlier with patients diagnosed with breast cancer than with control subjects ( $\chi^2 = 10.87$ ,  $P = 0.012$ ; Table 1). The examinees are also different by the history of the menopause genesis. Menopause posed earlier with examinees diagnosed with breast cancer ( $\chi^2 = 10.87$ ,  $p = 0.012$ ; Table 1).

According to our samples, housewives, 52 % of them, most oftenly get affected by breast cancer, retired women are second ones with 24 %, and when it comes to employed

	Experimental group n= 100 (%)	Control group n= 100 (%)	p*
Age subgroups (years)			$\chi^2$ 0.57, 0.751
26-35	2 (2)	3 (3)	
36-45	15 (15)	18 (18)	
>45	83 (83)	79 (79)	
Routine physical activity			$\chi^2$ 13.88, <b>0.016</b>
never	37 (37)	20 (20)	
rarely	33 (33)	49 (49)	
1X a week	8 (8)	9 (9)	
2 X a week	7 (7)	1 (1)	
3 X a week	2 (2)	2 (2)	
everyday	13 (13)	19 (19)	
Body mass index (BMI)			$\chi^2$ 47.03, 0.125
malnutrition	2 (2)	4 (4)	
ideal weight	27 (27)	33 (33)	
overweight	50 (50)	43 (43)	
obesity	21 (21)	20 (20)	
Employability/ secure existence			$\chi^2$ 13.15, <b>0.004</b>
unemployment	46 (46)	35 (35)	
employees	15 (15)	37 (37)	
pensioners	34 (34)	26 (26)	
other income	5 (5)	2 (2)	
Financial state of the family			$\chi^2$ 8.69, 0.192
the best	1 (1)	1 (1)	
much better than others	0 (0)	2 (2)	
better than others	10 (10)	13 (13)	
average	58 (58)	68 (68)	
below average	18 (18)	11 (11)	
much worse	6 (6)	2 (2)	
poverty, deprivation	7 (7)	4 (4)	
Place of residence			$\chi^2$ 2.37, 0.306
city	36 (36)	47 (47)	
countryside	58 (58)	46 (46)	
close to industrial facility	6 (6)	7 (7)	
Familiar history of breast cancer			$\chi^2$ 0.78, 0.391
sister	8 (8)	6 (6)	
mother	3 (3)	3 (3)	
aunt	5 (5)	4 (4)	
daughter	1 (1)	0 (0)	
brother's daughter	1 (1)	0 (0)	
further relative	5 (5)	1 (1)	
grandmother, grandmother's daughter	2 (2)	1 (1)	
sister's daughter	5 (5)	1 (1)	
Previous breast diseases			$\chi^2$ 0.17, 0.088
Unilateral breast cancer	4 (4)	0 (0)	
breast hyperplasia	1 (1)	0 (0)	
cystic breast changes	20 (20)	12 (12)	
cancer in situ	1 (1)	0 (0)	
X-ray iatrogenic exposure			$\chi^2$ 3.60, 0.165
Before 3. years of life	10 (10)	10 (10)	
1x a 5 years	53 (53)	62 (62)	
1x a 2 years	21 (21)	13 (13)	
1x a year	15 (15)	14 (14)	
more times a year	11 (11)	7 (7)	
CT a year			$\chi^2$ 10.63, <b>0.014</b>
never	66 (66)	85 (85)	

1X	22 (22)	6 (6)	
2X	6 (6)	3 (3)	
more times	6 (6)	1 (1)	
Exposure to nuclear medicine radiation			$\chi^2$ 0.98, 0.807
never	66 (66)	85 (85)	
1X	22 (22)	11 (11)	
2X	6 (6)	3 (3)	
more times	6 (6)	1 (1)	
History of the birth of the children			$\chi^2$ 1.56, 0.669
never	8 (8)	11 (11)	
treatment of sterility	1 (1)	1 (1)	
Born child before 30. years of life	84 (84)	83 (83)	
Born child after 30. years of life	7 (7)	6 (6)	
History arrival menopause			$\chi^2$ 10.87, <b>0.012</b>
not in menopause	23 (23)	39 (39)	
Before 40. years of life	11 (11)	2 (2)	
Between 40-50 years of life	40 (40)	34 (34)	
> 50 years of life	26 (26)	25 (25)	
Hormonal replacement therapy			$\chi^2$ 0.62, 0.311
never	98 (98)	99 (99)	
> 5 years	2 (2)	1 (1)	
Used Contraception			$\chi^2$ 0.62, 0.311
never	73 (73)	65 (65)	
<1 year	18 (18)	17 (17)	
>5 years	5 (5)	12 (12)	
>10 years	3 (3)	5 (5)	
>20 years	1 (1)	1 (1)	
Breast feeding			$\chi^2$ 2.16, 0.707
never	12 (12)	15 (15)	
Briefly, 1-2 months	24 (24)	22 (22)	
<1 year 1 child	21 (21)	22 (22)	
>1 year 2 children	28 (28)	21	
>1 year more children	15 (15)	20 (20)	
Intentional abortions			$\chi^2$ 1.95, 0.749
never	53 (53)	50 (50)	
1X	21 (21)	19 (19)	
2X	14 (14)	17 (17)	
3X	7 (7)	5 (5)	
more times	5 (5)	9 (9)	

Table 1. Demographic and individual characteristics of respondents compared between groups

women, the ones from service industry are third (Table 2). Linear regression analysis at which breast cancer was dependent variable, and way of living factors were independent variables, it came to our knowledge that there were some differences for breast cancer. Statistically significant relative risk for breast cancer genesis is increasing age, over 45 (experimental group) (OR= 1.2586, 95%CI, 0.6919- 2.289). Statistically significant relative risk for breast cancer origin is bad wealth status (OR=1.1449) and displeasure with mentioned situation (OR=1.1664; Table 3). When we analyse family predisposition to breast cancer we see there is significant relative risk if a sister was affected by breast cancer (OR=1.5247), if grandmother was affected by the breast cancer the risk grows lower (OR= 2.211), and if a distant relative had breast cancer the relative risk doubles comparing to

the case with grandmother (OR= 4.422; Table 3). Statistical significant risk factors for genesis of breast cancer from the area of iatrogen radiation was exposure to x-ray radiation until three years old (OR=1.290). It is important to point out that the exposure to CT diagnosis two or more times doubles the risk OR= 2.022; Table 3). Examinees who did not give birth to a child have the growing risk of breast cancer (OR=1.394), while the usage of hormone replacement therapy (OR= 1.826) and time of the menopause (OR=1.394) as well represent important breast cancer risk factors. Statistically significant is the time of the menarche (OR= 2.651) and previously *cistično* changed breasts (OR= 1.165; Table 3). The length to the cigarette smoke exposition represents important risk factor with examinees who smoke (OR= 1.531), the exposure to smoke by family members (OR= 1.260), the

exposure to smoke at a working place with examinees who are non-smokers (OR= 1.220). The alcohol consumption is also significant breast cancer risk factor (OR= 1.728). Not practicing the physical activity is significant predictor of the breast cancer genesis and it has been discovered by Multiple regression analysis (exp (B)=0.067 95% CI 0.009-0.504; P= 0.009, the result is not shown).

#### 4. DISCUSSION

Zenica- Dobož Canton is located in the central part of Bosnia and Herzegovina, with an area of 3343.3 km<sup>2</sup> with the population of 400 602 inhabitants (population density of 119.8 inhabitants / km<sup>2</sup>). A Cantonal is a unit of the Federation of Bosnia and Herzegovina (FB & H). The breast cancer accounted for 74.5% of all registered malignant diseases of women (26.1% index structure) and a major cause of women mortality. There are 25% of all malign diseases burden (21).

The strongest risk factor is gender and age (2, 3). What is the older female person has a higher risk of this malignancy (18, 19, 21, 22, 23). Thus increasing age significantly increases the risk of developing breast cancer. This is in accordance with the results of our study. Among our respondents two patients were aged 26-35 years (2% of 100 women with breast cancer). Women older than 45 years of age to have about 1.3 times more likely risk for develop breast cancer. In developed countries, often the risk is shifted by age category in women of advanced age > 60 or >65 years. In the United States in the period from 2000 to 2004 the median age of diagnosis of breast cancer was 61 years of age. The breast cancer was diagnosed in women younger than 20 years, 1.9% of them were aged 20-34 years, 10.6% aged 35-44 years, 22.2% aged 45-54 years, 22.9% aged 55-64 years, 20.2% aged 65-74 years, 16.7% aged 75-84 years and 5.4% aged over 85 godina (19). Similarly indications are for other countries. In the UK, according to the National Cancer Center (23), in 1996 risk of developing breast cancer at age 25 years is 1 in 15 000 women; at 30 age years 1 in 1900 women; under age 40 years 1 in 200 women; at age 50 years 1 in 50 women, from 50 to 60 years 1 in 23 women; at age 70 years 1 in 15 women; at age 80 years 1 in 11 women; from 80 to 85 years 1 in 10 women (10, 18). Our results reveal a higher incidence of breast cancer in younger age groups compared to developed countries (at age to 35 years, 2 in 100 women) and prevalence of diseases in the shift to younger age groups (18, 19). This is confirmed by research conducted by Saric (2009) in B&H, in Sarajevo Canton. The median age of cancer was 58 (22). With increasing age continuously increases length of exposure to carcinogens and aggravating factors? It should be noted that research in our country suggest that breast cancer occurs in younger age groups than in developed countries.

Specifically, patients with cancer are significantly poorer compared to the control group (31% vs. 17%, p < 0.001, Table 1). Subjects with cancer had a significantly uncertain existence in comparison to control subjects (only 15% of them employed). According to published studies women with higher level of socio- economic status had higher risk of breast cancer (12, 13, 26, 27). Our study results are contradictory and in fact poverty is a relative risk or worsening factor in the development of this serious disease, but is not

Exposure to environmental factors	Experimental group n= 100 (%)	Control group n= 100 (%)	p*
Occupation/ place of working			$\chi^2$ 12.41, <b>0.030</b>
housewife	52 (52)	42 (42)	
pensioners	24 (24)	17 (17)	
teaching staff	3 (3)	4 (4)	
health care workers	2 (2)	18 (18)	
administrative workers	6 (6)	6 (6)	
industrial workers	4 (4)	6 (6)	
services	9 (9)	7 (7)	
Smoking			$\chi^2$ 3.07, 0.879
never	65 (65)	64 (64)	
Stopped before 1 year	3 (3)	2 (2)	
Stopped before 2 years	6 (6)	5 (5)	
smoke <10 years	9 (9)	13 (13)	
smoke > 20 years	8 (8)	10 (10)	
smoke > 30 years	7 (7)	4 (4)	
smoke > 40 years	2 (2)	2 (2)	
Alcohol consumption			$\chi^2$ 0.04, 0.500
never	82 (82)	82 (82)	
often	13 (13)	16 (16)	
almost every day	5 (5)	2 (2)	
Perception of distress			$\chi^2$ 1.93, 0.859
never	3 (3)	2 (2)	
rarely	11 (11)	8 (8)	
sometime	40 (40)	43 (43)	
often	32 (32)	32 (32)	
everyday	13 (13)	15 (15)	
Exposure to chlorinated compounds			$\chi^2$ 3.05, 0.081
no	97 (97)	100 (100)	
yes	3 (3)	0 (0)	
Lead exposure			$\chi^2$ 0.33, 0.561
no	98 (98)	99 (99)	
yes	2 (2)	1 (1)	
Exposure to mercury			$\chi^2$ 0.33, 0.561
no	98 (98)	99 (99)	
yes	2 (2)	1 (1)	
Exposure to PAHs			$\chi^2$ 0.42, 0.516
no	94 (94)	96 (96)	
yes	6 (6)	4 (4)	
Exposure to other vapors			$\chi^2$ 0.72, 0.521
no	95 (95)	97 (97)	
yes	5 (5)	3 (3)	

Table 2. The distribution of subjects according to exposure of environmental factors compared between groups

a predictor for breast cancer. Studies worldwide showed that women in the higher risk of developing the disease compared to women living in rural areas (17, 19). There were no significant difference in the occurrence of diseases among women living in villages and cities. Usually, most of our patients live in the countryside.

We found negative trend for breast cancer in family history. If the grandmother had cancer increases the relative risk for nearly twice times more compared to the subjects without family predisposition (OR = 2.2), but risk is 4 times



Undependent variables, potential relative risk factors	Relative risk OR and 95% Confidence Interval (95%CI)*	
	OR	95%CI
Age > 45 godina	1.2586	0.691-2.289
Occupation	0.9004	0.781 - 1.037
Financial state of family	1.0362	0.766 - 1.401
Place of residence	1.0993	0.642 -1.882
Educational level	0.9508	0.736 - 1.227
Previos place of residence (before war)	1.0827	0.687 - 1.704
Worse financial state of family	1.1449	0.770 - 1.701
Disatisfaction with financial state of family	1.1664	0.844 - 1.610
Breast cancer had sister	1.5247	0.505 - 4.599
Breast cancer had aunt	0.6280	0.144 - 2.722
Breast cancer had grandmother	2.2111	0.196 - 2.487
Breast cancer had further relative	4.4222	0.483 - 4.043
Exposure to X-ray before 3 years of life	1.2908	0.839 - 1.985
Exposure to X-ray in life	0.9477	0.723 - 1.242
Exposure to CT (>2X per years)	2.0227	1.254 - 3.261
Exposure to nuclear medicine radiation	1.0337	0.690 - 1.548
Never birth child	1.3947	0.808 - 2.407
Birth child or children	0.9387	0.664 - 1.326
Had intentional abortions	0.9124	0.712 - 1.169
Breast- feeding	0.9394	0.708 - 1.241
Used contraception	0.7779	0.549 - 1.101
Used hormonal therapy	0.6015	0.049 - 7.341
Used replacement hormonal therapy	1.8258	1.637 - 10.590
Often exposed to stress	0.9724	0.702-1.351
Reduced physical activity	0.8919	0.746 - 1.065
Smoking	0.9033	0.555 - 1.469
Length of smoking time (years)	1.5314	0.756 - 3.098
Number of cigarettes per day	0.6416	0.323 - 1.272
Exposure to smoking at home	1.1260	0.788 - 1.608
Exposure to smoking at workplace	1.2203	0.889 - 1.675
Alcohol consumption	1.7283	0.396-7.533

Tabela 3. The association between potential risk-factors (undependent variables) and breast cancer (dependent variable) among respondents with breast cancer (n=100) \*Linerar logistic analysis

higher if the breast cancer had a distant cousin (OR = 4.4).

It is known that obesity and physical inactivity is a poor combination of increased risk of developing breast cancer (10, 26). Routine physical activity is associated with increased incidence of breast cancer (10, 12, 28). Women who do not have the habit of routine physical activity have a predictor of developing breast cancer (28, 29), as is the case in our patients (P=0.009). The previous experience in developed countries can be explained by factors of breast cancer associated with exposure to estrogens during reproductive time or change the concentration of this hormone in obese people, alcohol and persons with reduced physical activity (4, 5, 6, 7, 8, 9, 21).

Late menopause increases the risk of breast cancer. Women who have undergone the menopause have a lower

risk of breast cancer than pre-menopausal women of the same age and childbearing pattern. Risk increases by almost 3% for each year later at menopause (natural or induced by surgery), so that a women who has the menopause at 55 rather than 45, has approximately 30% higher risk (30, 31, 32, 33, 34). However, we found that menopause among patients with breast carcinoma come much earlier related to control subjects. ( $\leq 40$  years 11%; from 40-50 years 40%;  $p=0.012$ ). Why this is so? Did wars distress, and along with poor financial status and unemployment may be risk factors for breast cancer in the territory of Bosnia and Herzegovina remains to be explored!

This study is accompanied by certain difficulties and limitations. The basic limitation is the relatively small number of subjects. We miss very important questions about night work. It would be necessary include for each difficulties adequate research solutions in future research.

## 5. CONCLUSION

We found numerous contradictory study results related to results from other authors, for example our patients with breast cancer have: increasing breast cancer risks among younger age groups (opposite to thesis that with increasing age increases breast cancer risk); low level of income (opposite to thesis that in develop country patients with breast cancer have usually high level of income); early menopause (opposite to thesis that later menopause is predictor for breast cancer); negative growth trend for breast cancer in the conditions of clearance to close relatives; our patients with breast cancer have mainly overweight or obesity which is not significantly breast cancer risk.

Patients are be educated on medical treatment side effect prevention (diagnostic CT or hormonal substitute treatment risks), elimination of workplace predictors of breast cancer (as rotating night shifts), or healthy food intake and protection with continued physical activity (29, 30, 31, 32, 33, 34).

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