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# Effect of focused birth preparedness and complication readiness counseling on pregnancy outcome among females attending tertiary care hospital in Barabanki district, Uttar Pradesh, India

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## Abstract:

**CONTEXT:** Measures related to birth preparedness and complication readiness (BPCR) during pregnancy play an important role in producing better pregnancy outcome. If the pregnant females are properly counseled during antenatal visits, it could help in bringing out desirable behavior changes.

**AIMS:** This study aims to study BPCR-related awareness and practices among the pregnant females and the effect of focused and structured birth preparedness counseling on complication readiness among pregnant females.

**SUBJECT AND METHODS:** A facility-based follow-up study was conducted from July to December 2016, and a total of 130 pregnant females were enrolled. All study participants were initially assessed for various domains of BPCR index consisting of seven key indicators. The index reassessment was done again, after 1 month, during follow-up visit. Information regarding any pregnancy-related complication in due course and behavior was also recorded during successive follow-up.

**STATISTICAL ANALYSIS USED:** The difference in pre- and postcounseling mean BPCR index was assessed using paired *t*-test, and McNemar's test was used for paired categorical data analysis.  $P < 0.05$  was considered to be statistically significant.

**RESULTS:** The postcounseling BPCR index ( $70.65 \pm 19.18$ ) was found to be significantly much higher as compared to pre-counseling baseline BPCR index ( $41.12 \pm 11.34$ ). Knowledge about danger signs of pregnancy, transportation services provided by government, financial assistance provided in Government schemes, identification of skilled birth attendant, mode of transportation, and arrangement of emergency blood donor was found to increase significantly after counseling. Abortion was found to occur significantly higher (about thrice) among those who had postcounseling BPCR index below average, i.e.,  $<50\%$  ( $P < 0.05$ ).

**CONCLUSIONS:** The results of the present study revealed that focused birth preparedness counseling on complication readiness could play an important role in increasing the baseline knowledge of pregnant females regarding pregnancy-related complications and bring out desirable ideal health-seeking behavior changes during pregnancy.

## Keywords:

Birth preparedness, complication readiness, counseling, focused

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## Introduction

Vital estimates related to maternal, infant, and perinatal mortality provide a reflection about spectrum of services provided to community in context to maternal and child health. The recent estimates of maternal mortality ratio (MMR), infant mortality rate (IMR), and perinatal mortality rate are 167/lakh live births (LB), 41 and 24/1000 LB, respectively.<sup>[1,2]</sup> Infant and maternal mortality rates are quite high in developing countries; however, majority of the morbidities and deaths among mothers and children could be prevented by health promotion-related interventions.<sup>[3]</sup> Majority of maternal deaths occur during labor, delivery, and within 24-h postpartum with one-third of neonatal deaths occurring on the 1<sup>st</sup> day of life. Apart from medical reasons, there are numerous other interrelated biosocial factors which delay care seeking and lead to these deaths.<sup>[4]</sup> Therefore, comprehensive measures taken during pregnancy, both at individual and health-care sides, are basically directed toward producing better pregnancy outcome. Intervention at individual level could play an important role in bringing out desirable change in health-seeking behavior among pregnant females. Focused counseling on birth preparedness and complication readiness (BPCR) is one of the simple interventions that address these delays by encouraging pregnant women, their families, and communities to effectively plan for births and deal with emergencies if they occur. BPCR is defined as a programmatic approach to improve the use and effectiveness of key maternal and newborn health services, based on the premise that preparing for birth and being ready for complications reduce all three phases of delays in receiving the services (i.e., delays in seeking care, reaching the health-care facility, and in receiving adequate care at the point of service).<sup>[5]</sup> Although BPCR is essential for further promotion of maternal and child health (especially in terms of maternal/infant mortality), a little is known about the current magnitude and influencing factors in Uttar Pradesh, India (state with suboptimal maternal and child health indicators with MMR of 201/lakh LB and IMR 52/1000 LB).<sup>[6,7]</sup> Therefore, the present study was conducted to study BPCR-related awareness and practices among the pregnant females and the effect of focused and structured birth preparedness counseling on complication readiness among pregnant females.

## Subject and Methods

### Study design

This was a facility-based follow-up study.

### Study settings

The study was conducted by the Department of Community Medicine in collaboration with Department of Obstetrics and Gynaecology.

### Study unit

Pregnant females aged  $\geq 18$  years attending outpatient facility and in the first or second trimester of pregnancy with residence within the catchment area of institute. Pregnant females who visited health facility with acute medical condition were excluded from the study.

### Sample size

Based on the reported BPCR index of 47.5%,<sup>[8]</sup> and an allowable error of 9%, the total sample size required was calculated to be 130 (formula used:  $n = z^2pq/e^2$ , where  $n$  = sample size,  $z$  = value of standard normal deviate = 1.96 at 95% confidence interval,  $P$  = prevalence of nonadherence,  $q = 1-p$ , and  $e$  = allowable error).<sup>[9]</sup>

### Sampling technique

Based on the estimates of average outpatient department attendance and proportion of females in the first or second trimester of pregnancy, complete enumeration process was adopted for enrolment of the study participants and to achieve desired sample size.

### Study procedure

The counseling cum interviewer guide was used for the assessment of baseline indicator. Key guide consisted domain-wise discussion of the components related to BPCR and their targeted benefit principles by the means of textual materials and pictures. Furthermore, Mother-Child Protection Card was used as supportive counseling aid tool. The staff nurses and counselors were trained regarding each and every domain before the commencement of study. Apart from providing therapeutic services to health-seeking mothers during antenatal visit, the consultant used to supervise counseling sessions too. The participants were initially assessed for baseline knowledge. After providing comprehensive information through focused counseling to mothers in relation to BPCR index, reassessment was done again after 1 month during follow-up visit. The pregnancy outcome and information regarding any pregnancy-related complication in due course and behavior were also recorded during successive follow-up [Figure 1].

### Data collection

A total of 130 pregnant females were initially assessed for various domains of BPCR index consisting of following seven indicators, namely, percentage of the women who know about more than eight danger signs of pregnancy (1\*), percentage of the women who knew about transportation services provided by government schemes (2\*), percentage of the women who knew about financial assistance provided in government schemes (3\*), percentage of the women who availed ANC in 1<sup>st</sup> trimester by skilled provider (4\*), percentage of the women who identified skilled birth attendant for

delivery (5\*), percentage of the women who identified mode of transportation (6\*), and percentage of the women who are saving money/saved money to pay for expenses (7\*). Socioeconomic status was assessed using Modified BG Prasad scale 2016.<sup>[10]</sup>

### Statistical analysis

Collected data were entered directly into the Excel sheets primarily and then transferred after data cleaning and rechecking to Epi Info software for analyzing according to aims and objectives. The descriptive results were presented in forms of frequency and mean with standard deviation. The difference in pre and postcounseling was assessed using paired *t*-test and McNemar’s test ( $P < 0.05$  was considered to be statistically significant).

### Ethical clearance

Ethical clearance was obtained from institutional ethics committee before commencement of study.

## Results

A total of 323 pregnant females were screened during the time frame of study to attain the desired sample size of 130. Of 323, only 146 females were in the first or late second trimester of pregnancy. Furthermore, 16 cases were excluded as per the criteria (3 females did not give consent and 13 came with acute medical condition). Of 130 enrolled pregnant females, the complete postpartum follow-up information could be done only from 86 participants for pregnancy outcome in context to abortion, mode of delivery, and birth weight of newborn [Figure 1].

Almost half of the pregnant females enrolled in the study were in age group of 18–24 years and 25–34 years (48.5% and 49.2%, respectively). Only 2.3% of females were aged 35 years or above. About 87.7% of the study participants belonged to Hindu religion and majority (91.5%) resided

in rural areas. Almost half (53.8%) of the pregnant females belonged to unreserved social category. About 44.4% of females were illiterate, while 2.3% were educated up to graduation and above. Almost half (49.2%) of the study participant belonged to upper lower socioeconomic status followed by 38.5% in lower socioeconomic group. About 9.2% of the pregnant females were employed and were engaged in some sort of occupation. Majority of the females were of gravida 1 or 2 (45.4% and 43.8%, respectively) [Table 1].

Overall baseline BPCR index was found to be 45.12%. Knowledge about more than eight danger signs of pregnancy (26.1%), transportation services (57.6%), and financial assistance (49.2%) provided under government schemes, pregnancy registration during first trimester (36.9%), identification of skilled birth

**Table 1: Distribution of pregnant females on the basis of sociodemographic characteristics (n=130)**

Biosocial characteristic	n (%)
Age group	
18-24	63 (48.5)
25-34	64 (49.2)
>35	3 (2.3)
Religion	
Hindu	114 (87.7)
Non-Hindu	16 (12.3)
Residence	
Rural	119 (91.5)
Urban	11 (8.5)
Social category	
Unreserved	70 (53.8)
OBCs	23 (17.7)
SC/ST	37 (28.5)
Type of family	
Joint	81 (62.3)
Nuclear	49 (37.3)
Educational status	
Illiterate	59 (44.4)
Up to primary	53 (40.8)
Up to high school	15 (11.5)
Up to graduate and above	3 (2.3)
Socioeconomic status <sup>#</sup>	
I (upper)	1 (0.8)
II (middle)	5 (3.8)
III (lower middle)	10 (7.7)
IV (upper lower)	64 (49.2)
V (lower)	50 (38.5)
Employment status	
Employed	12 (9.2)
Unemployed	118 (90.8)
Gravida	
1	59 (45.4)
2	57 (43.8)
3 or more	14 (10.8)

<sup>#</sup>Modified BG Prasad socioeconomic scale 2016. OBCs=Other backward castes, SC/ST=Scheduled castes/scheduled tribes

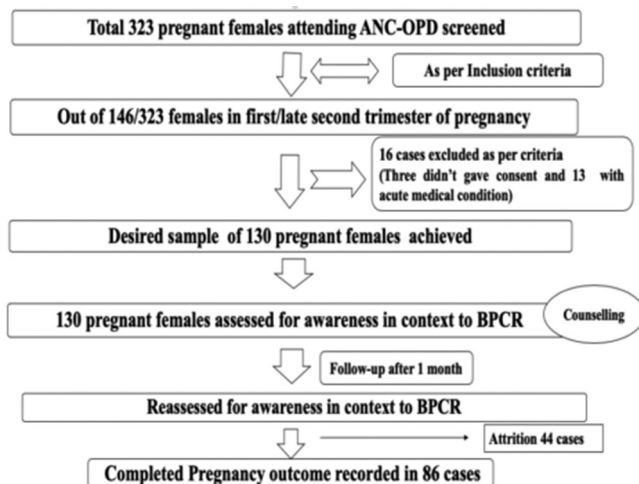


Figure 1: Study procedure for data collection

attendant (56.1%), and mode of transportation (40.1%); and saving the money for paying pregnancy-related expenses (50.0%) was found to be quite suboptimal during the baseline assessment. Among the biosocial characteristics as independent variable, social category was found to be significantly associated with saving of money to pay pregnancy-related expenses. About 60% of the pregnant females of unreserved category were saving money to pay for future pregnancy-related expenses while only 34.8% of the other backward castes (OBCs) and 40.5% of the females in scheduled castes/tribes (SC/ST) were practicing the same. Knowledge about financial assistance under government schemes was also found to be associated with employment status of females. About 45.8% of the unemployed females and 3.3% employed females had knowledge about financial assistance under

government scheme. The association between other independent variables such as age, educational status, religion, type of family, residence, gravida, and other BPCR indicators was not found to be significant [Table 2].

The postcounseling BPCR index (70.65 ± 19.18) was found to be significantly much higher as compared to precounseling baseline BPCR index (41.12 ± 11.34). BPCR index was found to increase significantly after focused and structured counseling. Knowledge about >8 danger signs of pregnancy, transportation services provided by government, financial assistance provided in government schemes, identification of skilled birth-attendant, mode of transportation, and arrangement of emergency blood donor was found to increase significantly after counseling [Table 3].

**Table 2: Distribution of baseline birth preparedness and complication readiness indicator and index on the basis of biosocial and obstetric characteristics (n=130)**

Biosocial characteristic	1*	2*	3*	4*	5*	6*	7*	BPCR index
<b>Age group</b>								
18-24	15 (23.8)	38 (60.3)	29 (46.0)	21 (33.3)	31 (49.2)	21 (33.3)	31 (49.2)	42.15
25-34	19 (29.7)	34 (53.1)	34 (53.1)	27 (42.2)	40 (62.5)	30 (46.9)	32 (50.0)	48.21
>35	0 (0.0)	3 (100.0)	1 (33.3)	0 (0.0)	2 (66.7)	1 (33.3)	2 (66.7)	42.85
<b>Religion</b>								
Hindu	31 (27.2)	65 (57.0)	58 (50.9)	45 (39.5)	62 (54.4)	44 (38.6)	58 (50.9)	45.5
Non-Hindu	3 (18.8)	10 (62.5)	6 (37.5)	3 (18.8)	11 (68.8)	8 (50.0)	7 (43.8)	42.88
<b>Residence</b>								
Rural	29 (24.4)	68 (57.1)	59 (49.6)	43 (36.1)	69 (58.0)	48 (40.3)	58 (48.7)	44.88
Urban	5 (45.5)	7 (63.6)	5 (45.5)	5 (45.5)	4 (36.4)	4 (36.4)	7 (63.6)	48.07
<b>Social category</b>								
Unreserved	17 (24.3)	41 (58.6)	38 (54.3)	30 (42.9)	38 (54.3)	30 (42.9)	42 (60.0) *	48.18
OBCs	9 (39.1)	12 (52.2)	8 (34.8)	7 (30.0)	17 (73.9)	11 (47.8)	8 (34.8) *	44.65
SC/ST	8 (21.6)	22 (59.5)	18 (48.6)	11 (29.7)	18 (48.6)	11 (29.7)	15 (40.5) *	39.74
<b>Type of family</b>								
Joint	25 (30.9)	48 (59.3)	39 (48.1)	33 (40.7)	41 (50.0)	30 (37.0)	37 (45.7)	44.52
Nuclear	9 (18.4)	27 (55.1)	25 (51.0)	15 (30.6)	32 (65.3)	22 (44.9)	28 (57.1)	46.05
<b>Educational status</b>								
Illiterate	13 (22.0)	34 (57.6)	31 (52.5)	18 (30.5)	31 (52.5)	22 (37.3)	32 (54.2)	43.8
Up to primary	16 (30.2)	30 (56.6)	25 (47.2)	24 (45.3)	31 (58.5)	25 (47.2)	22 (41.5)	46.64
Up to high school and above	5 (27.8)	11 (61.1)	8 (44.4)	6 (33.3)	11 (61.1)	5 (27.8)	11 (61.1)	45.22
<b>Socioeconomic status<sup>#</sup></b>								
Lower middle and above	5 (31.3)	8 (50.0)	7 (43.8)	2 (12.5)	7 (43.0)	4 (25.0)	6 (37.5)	34.72
Upper lower	13 (20.3)	40 (62.5)	28 (43.8)	23 (35.9)	36 (56.3)	29 (45.3)	33 (51.6)	45.10
Lower	16 (32.0)	27 (54.0)	29 (58.0)	23 (46.0)	30 (60.0)	19 (38.0)	26 (52.0)	48.57
<b>Employment status</b>								
Employed	1 (8.3)	9 (75.0)	10 (3.3) *	2 (16.7)	7 (58.3)	3 (25.0)	8 (66.7)	36.18
Unemployed	33 (28.0)	66 (55.9)	54 (45.8) *	46 (39.0)	66 (55.9)	49 (41.5)	57 (48.3)	44.91
<b>Gravida</b>								
1	16 (27.1)	30 (50.8)	31 (52.5)	21 (35.6)	30 (50.8)	23 (39.0)	29 (49.2)	43.57
2	14 (24.6)	35 (61.4)	25 (43.9)	21 (36.8)	33 (57.9)	23 (40.4)	28 (49.1)	44.87
3 or more	4 (28.6)	10 (71.4)	8 (57.1)	6 (42.9)	10 (71.4)	6 (42.9)	8 (57.1)	53.05
<b>Previous history of abortion</b>								
Present	11 (23.9)	29 (63.0)	25 (54.3)	18 (39.1)	26 (56.5)	14 (30.4)	21 (55.7)	46.12
Absent	23 (27.4)	46 (54.8)	39 (46.4)	30 (35.7)	47 (56.0)	38 (45.2)	44 (52.4)	45.41
Total	34 (26.1)	75 (57.6)	64 (49.2)	48 (36.9)	73 (56.1)	52 (40.0)	65 (50.0)	45.12

\*Respective indicators mentioned in data collection subsection of material and methods, <sup>#</sup>Modified BG Prasad socioeconomic scale 2016, P<0.05. BPCR=Birth preparedness and complication readiness, OBCs=Other backward castes, SC/ST=Scheduled castes/schedule tribes

Of 86 pregnant females who were followed completely till postpartum period, proportion of abortion was found to occur significantly higher (about thrice) among those who had postcounseling BPCR index below average, i.e., <50% ( $P < 0.05$ ). Although proportion of pregnant females (out of rest 83) who had cesarean delivery or low birth weight was higher among those with BPCR index below

average, it was statistically nonsignificant ( $P > 0.05$ ) [Table 4].

### Discussion

This facility-based study has made an attempt to study birth preparedness and compilation readiness-related awareness and practices among pregnant females. The

**Table 3: Distribution of pregnant females on the basis of pre- and postcounseling birth preparedness and complication readiness**

Indicator	Postcounseling		McNemar's test, <i>P</i>
	Yes	No	
Knowledge about danger signs of pregnancy			
Precounseling			
Yes ( <i>n</i> =34)	33 (97.1)	1 (2.9)	0.00
No ( <i>n</i> =96)	67 (69.8)	29 (30.2)	
Total	100	30	
Knowledge about transportation services provided by Government			
Precounseling			
Yes ( <i>n</i> =75)	75 (100.0)	0 (0.0)	0.00
No ( <i>n</i> =55)	50 (90.9)	5 (9.1)	
Total	125	5	
Knowledge about financial assistance provided in Government schemes			
Precounseling			
Yes ( <i>n</i> =64)	64 (100.0)	0 (0.0)	0.00
No ( <i>n</i> =66)	37 (56.1)	29 (43.9)	
Total	101	29	
Identified skilled birth attendant			
Precounseling			
Yes ( <i>n</i> =73)	73 (100.0)	0 (0.0)	0.00
No ( <i>n</i> =57)	38 (66.7)	19 (33.3)	
Total	111	19	
Identified mode of transportation			
Precounseling			
Yes ( <i>n</i> =52)	52 (100.0)	0 (0.0)	0.00
No ( <i>n</i> =78)	45 (57.7)	33 (42.3)	
Total	97	33	
Saved money to pay for expenses			
Precounseling			
Yes ( <i>n</i> =65)	37 (56.9)	28 (43.1)	0.12
No ( <i>n</i> =65)	42 (64.6)	23 (35.4)	
Total	79	51	
Identified blood donor in case of emergency			
Precounseling			
Yes ( <i>n</i> =23)	23 (100.0)	0 (0.0)	0.00
No ( <i>n</i> =107)	78 (72.9)	29 (27.1)	
Total	101	29	

**Table 4: Association between postcounseling birth preparedness and complication readiness index with pregnancy outcome**

BPCR index	Abortion ( <i>n</i> =86)		Mode of delivery ( <i>n</i> =83)		Birth weight ( <i>n</i> =83)	
	Occurred ( <i>n</i> =3)	Didn't occurred ( <i>n</i> =83)	Cesarean ( <i>n</i> =25)	Normal vaginal ( <i>n</i> =58)	<2.5 kg	≥ 2.5 kg
<50%	2 (33.3)	4 (66.7)	3 (60.0)	2 (40.0)	4 (83.3)	1 (16.7)
>50% <sup>⊙</sup>	1 (1.3)	79 (98.8)	22 (28.2)	56 (71.8)	33 (41.6)	45 (58.4)
Unadjusted odds ratio (95% CI)	39.5 (2.92-53.98)*		3.81 (0.59-24.42)		5.45 (0.58-51.07)	

\* $P < 0.05$ . CI=Confidence interval, BPCR=Birth preparedness and complication readiness



observed bpcr index in the study was found to be 45.12%. Index was much lower as compared to the findings of a study conducted by, in Karnataka, Akshaya and Shivalli who reported optimal BPCR practice in 79.3% of the pregnant females.<sup>[11]</sup> However, the findings are quite comparable to other study conducted in India where the awareness and practices related to BPCR were found to be ranging between 34.5% and 49.4%.<sup>[8,12-15]</sup> Level of birth preparedness was found to be quite higher in a study conducted in neighboring country, Nepal, where 65% of the pregnant females reported to be prepared for at least whole of the birth preparedness arrangement.<sup>[16]</sup>

Apart from that various other studies conducted in African countries has also reported BPCR varying between 16.5% and 58.2%.<sup>[17-20]</sup> These differences in between the various studies might be attributed to variation in baseline and sociodemographic characteristics of the study population. Apart from that these studies had been conducted in different geographical territories. Thus, difference baseline comprehensive health infrastructure available in these regions might be playing an intervening role thereby affecting the knowledge and practices of pregnant females in context to BPCR.

In our study, social category was found to be significantly associated with the practice of saving money for bearing any pregnancy-related expenses in the future. The practice of saving money was comparatively lower among OBCs and SC/ST as compared to pregnant female belonging to unreserved category. This could be explained by the role of education and socioeconomic status as a powerful intervening component among unreserved subgroup, especially those residing in rural communities. Furthermore, comparatively higher proportion of unemployed female had the knowledge about financial assistance provided under government schemes indirectly reflecting toward the eagerness of nonearning groups to gain idea of any sort of financial assistance that could be availed by them through formal channels. Similar to the research findings reported by Akshaya and Shivalli and other studies conducted worldwide, educational status of pregnant females was not found to be associated with BPCR.<sup>[11,15,21]</sup> In contradiction to that, Agarwal *et al.* and Nithya *et al.*, from their studies conducted at Madhya Pradesh and Puducherry, respectively, concluded educational status of the women to be significantly associated with BPCR.<sup>[4,22]</sup> Furthermore, other studies conducted worldwide also highlighted the significant influence of woman literacy on BPCR.<sup>[16,23,24]</sup> However, in contradiction to the findings of previous studies, no association of BPCR was observed in respect to their other biosocial and obstetrics characteristics such as gravida, religion, and residence.<sup>[4,11,14,22,25]</sup>

In our study, BPCR index was found to increase significantly after focused and structured counseling of pregnant females. The domain-wise knowledge and desirable practices in context to BPCR were found to increase significantly after counseling. Similar to the findings of our study, Nithya *et al.*, in their study, also found the formal counseling as one of the BPCR-independent predictors.<sup>[22]</sup> Furthermore, in a study conducted in Nigeria, pregnant females who received counseling had about two times better knowledge of BPCR compared to those who did not receive the same.<sup>[26]</sup> This finding of our study further reinforces the known fact that focused and structured counseling has positive impact on knowledge and attitude of pregnant females to incorporate desirable practices during pregnancy.<sup>[27]</sup> In our study, unfavorable pregnancy outcome like abortion was found to be comparatively much higher among the pregnant females who had suboptimal BPCR index even after the counseling. This reflects the importance of BPCR to have favorable birth outcome that has been reported in previous studies too.<sup>[16,28,29]</sup> Thus, the better pregnancy outcome in terms of maternal and fetal health could be achieved by directly optimizing the BPCR awareness and practices by means of focused and structured counseling like interventions.

### Limitations of study

Since the study was conducted in facility-based settings, its generalizability is quite limited. Apart from that exact pregnancy outcome of 44 cases could not be traced during follow-up and therefore could not be made part of conclusive inferences during analysis. Furthermore, family, community, and health-care level factors associated with BPCR were also not explored in the present study. However, despite these limitations, the findings of the study enlighten the positive effect of counseling on BPCR-related knowledge and practices.

### Conclusions

Baseline knowledge and practices in relation to BPCR were found to be suboptimal among pregnant females, which increases significantly after focused and structured counseling. Thus, simple information education and communication-based intervention like counseling could be used as powerful and practical tool for women in reproductive age group both in community and health-care settings for preparing mothers to deal in the best way with childbirth and its complication. Apart from that a combined and coordinated comprehensive approach with involvement of all modes like one-to-one communication as well as use of audio-visual aids could help the mothers to increase the awareness of mothers regarding BPCR.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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