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Original Research Article

Oral intake during labor and its effect on labor progression in Indian women at a tertiary care centre

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ABSTRACT

Background: Assessment of the subjective perception of the women regarding satisfaction of oral intake during labor and the effect of oral intake on cervical dilatation rates and labor duration in low-risk laboring women.
Methods: A prospective observational study was conducted from January 2021-July 2022 in a tertiary care hospital with 176 low risk laboring women. Satisfaction of oral intake in labor was assessed by a questionnaire post-delivery and the answers were analysed among various parous groups and were correlated with cervical dilatation rates in active and latent phase and duration of labor.
Results: Based on the satisfaction of oral intake in labor, the patients were divided into very satisfied, satisfied, neutral and dissatisfied group. Only 6.7% of primigravidas and 25% of multigravidas were very satisfied with oral intake. Patients who were dissatisfied and not satisfied with oral intake had slower median rates of cervical dilation of 0.45 cm/hour and 1.25 cm/hour in latent and active phase respectively compared to the very satisfied group who had a rate of 0.5 cm/hour and 2.4 cm/hour in the latent and active phase in primigravidas. The mean duration of the first and second stage of labor was 15.5 hours and 50 minutes in the dissatisfied group which was prolonged compared to the patients who had very satisfied oral intake in labor with a duration of 9.6 hours and 30.8 minutes respectively among the primi-gravidas
Conclusions: In primi-gravidas the cervical dilation rates were faster in the group who were very satisfied and satisfied with their oral intake compared to the group who were dissatisfied. The labor duration was also prolonged among the dissatisfied group.

Keywords: Cervical dilatation rates, Oral intake during labor, Satisfaction of oral intake during labor

INTRODUCTION

During labor oxygen consumption, carbon dioxide production, and maternal venous lactate increase. Energy needs increase with pain. During labor, a source of energy in the form of carbohydrates is often necessary. The policy of fasting during labor was adopted after Mendelson published his now classic description of acid pulmonary aspiration in 1946.[1] The obstetric guideline of the American society of anaesthesiologists, published in 2007, stated that "the oral intake of solids during labour increases maternal complications," and that "solid foods should be avoided in laboring patients.[2] To date only few studies have done correlating the effect of oral intake in labor with labor outcomes.[3,4] However, one study reported an almost threefold increase in the rate of caesarean delivery with carbohydrate intake[3] and another study in 2009 reported that consumption of a light diet during labour did not influence obstetric or neonatal outcomes in participants, nor did it increase the incidence of vomiting.[4]

Various recommendations are given by various selected professional organizations on food intake during labor. American college of nurse-midwives recommends

midwives and physicians to discuss the potential benefits of oral intake during labor with women.[5] American college of obstetricians and gynecologists recommends less-restrictive food intake is associated with a shorter duration of labor compared with more restrictive food intake.[6] American society of anaesthesiologists task force on obstetric anaesthesia recommends small amounts of clear liquids up to 2 hours before anaesthesia for women with no complications.[7] World health organization suggests non-interference with labouring women's desire for food or liquid intake without cause.[8]

Whether food intake in labour will influence the ability to deliver normally, the length of labour, labor progression rates, overall satisfaction of labor experience, exhaustion is not well studied. This study aims to cover the paucity of knowledge on the oral intake in labor and its effect on labor duration and cervical dilatation rates.

METHODS

This study was a prospective observational study conducted from Jan 2021-April 2022 in a tertiary care hospital. The objective of the study is to assess the subjective perception of the women, regarding satisfaction of oral intake during labor, and if oral intake would have improved labor experience and the effect of oral intake on cervical dilatation rates and labor duration in low-risk laboring women.

The inclusion criteria were term gestation with spontaneous onset of labor with singleton cephalic pregnancy with cervical dilatation of ≤4 cm in first per vaginal examination and in the absence of significant co-morbidities and women with previous caesarean section, major congenital malformation and with severe adverse neonatal outcomes were excluded from the study.

At the time of admission in the labor room, woman was assessed and those meeting all the inclusion and exclusion criteria were enrolled in the study. The participants were given patient information sheet and written informed consent was taken. The participants were given treatment during labor as per the standard protocol. The participants were asked about her subjective perception on oral intake in labor which were recorded in predefined and pretested proforma within 24 to 48 h of delivery shown in Table 1.

The sample size taken for this was 170. This study was a part of the study which was conducted to study the labor pattern in Indian women

Statistical analysis

Data was coded and recorded in Microsoft excel spreadsheet program. SPSS v25 (IBM Corp.) was be used for data analysis. Descriptive statistics were elaborated in the form of mean, standard deviations and median, IQR for continuous variables, and frequencies and percentages for categorical or ordinal variables. Statistical significance was kept at $p<0.05$. Approval from the institutional research ethics committee was taken prior to starting the trial. This study was a part of the study which was conducted to study the labor pattern in Indian women. CTRI trial registration number: CTRI/2022/02/040192.

RESULTS

A total of 188 women were assessed for eligibility and enrolled in the study. As 11 women underwent cesarean section for various indications, these women were excluded from the study. Further 7 women had several complications which as per exclusion criteria, were also excluded from the study. Finally, 170 women were included in the statistical analysis.

Demographic profile

The mean age of the study patients was 25.98±4.04 years. Most of the participants were primary and high school passed and belonged to lower middle and upper lower socioeconomic status as per modified Kuppusamy scale.

The study subjects were divided into 2 groups as primi-gravidas (n=75) and multigravidas (n=95).

Oral intake during labor-questionnaire based assessment

Table 2 summarizes the questionnaire-based assessment of satisfaction of oral intake in labor. Only 6.7% of primigravidas and 25% of multigravidas were very satisfied with oral intake. Most of the primigravida and multigravida were hungry during labor however the hunger was exhaustive in 45% of the primigravidas and 12% of the multigravidas. The 89% of the primigravida and 42% of the multigravidas had responded that if they had taken orally, their labor pain tolerance and effort would have been better (Figure 1 and 2).

Primigravidas-oral intake in labor

On analysing the different parameters of satisfaction in primigravidas as shown in Table 3 the patients who were very satisfied with oral intake during labor had taken some kind of oral intake in the form of juice, milk, bread, dahlia etc. Of the patients who were dissatisfied and had neutral satisfaction with oral intake, almost all were exhausted in labor. Most of them had just liquids like water and tea. These patients felt that they could have done better with some form of oral intake in labor.

Multigravidas-oral intake in labor

On analysing the different parameters of satisfaction in multigravidas as shown in Table 4 the patients who were very satisfied and satisfied with oral intake during labor had taken some kind of oral intake in the form of juice, milk, bread, dahlia, banana etc. whichever was available in the hospital. Few multigravidas who were admitted in active labor had progressed soon and delivered that they

did not have any oral intake and were even satisfied. But they have responded that they had food before being admitted in hospital. Of the patients who were dissatisfied and had neutral satisfaction with oral intake, were exhausted in labor. Most of them had just liquids like water and tea. Two of them did not have anything in labor. These patients felt that they could have done better with some form of oral intake in labor making their efforts satisfactory.

Effect of oral intake on cervical dilatation among primigravidas

On analysing the effect of oral intake in labor on their cervical dilatation rates in primigravidas, those patients who were dissatisfied or had neutral satisfaction had slower progression rates of cervical dilatation in both latent and active phase (Table 3). The rate of cervical dilation in latent phase was slower as the oral intake was affected during labor (Figure 3).

Effect of oral intake on cervical dilatation rates in multigravidas

On analysing the effect of oral intake in labor on their cervical dilatation rates in multigravidas (Table 4) there was not much statistically significant change in cervical dilatation rates with oral intake in labor whereas the duration of labor was prolonged with reduced oral intake compared to the satisfied group. Slow progression of the cervical dilatation rates was seen in the dissatisfied group in the latent phase as compared to neutral and satisfied groups but these were not statistically significant owing to the small sample number in the dissatisfied group.

Table 1: Questionnaire for oral intake during labor.

Questionnaire	Ans
Were you satisfied with the oral intake you had during labor?	Very satisfied
	Satisfied
	Neutral
	Dissatisfied
Did you feel hungry during labor? If yes, what did you eat?	Yes/No
Did you feel nausea while oral intake during labor?	Yes/No
Were you given IV fluids during labor	Yes/No
Did hunger make you exhaust soon during labor	Yes/No
Did you feel that if you would have had something orally your efforts could have been better during labor	Yes/No

Table 2: Patient satisfaction of oral intake during labor.

Questionnaire	Primigravida, n (%)	Multigravida, n (%)	Total, n (%)	P value
Were you satisfied with the oral intake you had during labor?				
Very satisfied	5 (6.7)	24 (25.3)	29 (17.1)	<0.001
Satisfied	49 (65.3)	64 (67.4)	113 (66.5)	
Neutral	16 (23.7)	5 (5.3)	21 (12.3)	
Dissatisfied	5 (6.7)	2 (2.1)	7 (4.1)	
Did you feel hungry during labor?	72 (96)	81 (85.3)	153 (90)	0.02
Did you feel nausea while oral intake during labor?	27 (36)	11 (11.6)	38 (22.4)	<0.001
Were you given IV fluids during labor	68 (90.7)	65 (68.4)	133 (78.2)	0.001
Did hunger make you exhaust soon during labor	34 (45.3)	12 (12.6)	46 (27.1)	<0.001
Did you feel that if you would have had something orally your efforts could have been better during labor	67 (89.3)	40 (42.1)	107 (62.9)	<0.001

Table 3: Effect of oral intake on cervical dilatation among primigravidas.

Questionnaire	Very satisfied, n=5, n (%)	Satisfied, n=49, n (%)	Neutral, n=16, n (%)	Dissatisfied, n=5, n (%)	P value
Felt hungry during labor	5 (100)	47 (95.9)	15 (95)	5 (100)	0.95
Nausea while oral intake	1 (20)	16 (32.7)	5 (45)	5 (100)	0.35
IV fluids during labor	5 (100)	42 (85.7)	16 (100)	5 (100)	0.25
Did hunger make you exhaust soon during labor	0	16 (32.7)	13 (85)	5 (100)	<0.001
Did you feel that if you would have had something orally your efforts could have been better during labor?	3 (60)	43 (87.8)	16 (100)	5 (100)	0.06

Continued.

Questionnaire	Very satisfied, n=5, n (%)	Satisfied, n=49, n (%)	Neutral, n=16, n (%)	Dissatisfied, n=5, n (%)	P value
Average rate of cervical dilatation and duration of labor					
From onset of labor until 4 to 6 cm dilatation of cervix (cm/hour) median (IQR)	0.51 (0.31-0.58)	0.46 (0.25-0.80)	0.45 (0.26-0.67)	0.3	0.91
After 4 to 6 cm dilatation till full dilatation of cervix (cm/hour) Median (IQR)	2.4 (1.7-3.5)	2 (1.45-3.0)	1.25 (0.91-2.0)	0.8	<0.001
Duration of first stage (Hours) *	9.6	9.8	12.62	15.5	<0.001
Duration of second stage (Minutes)*	30.8	33.8	37	50	<0.001

*Data expressed as mean. IQR- interquartile range.

Table 4: Effect of oral intake on cervical dilatation rates in multigravidas.

Questionnaire	Very satisfied, n=24, n (%)	Satisfied, n=64, n (%)	Neutral, n=5, n (%)	Dissatisfied, n=2, n (%)	P value
Felt hungry during labor	22 (91.7)	52 (81.2)	5 (100.)	2 (100)	0.42
Nausea while oral intake during labor	1 (4.2)	8 (12.5)	2 (40)	0	0.13
IV fluids during labor	9 (37.5)	49 (76.6)	5 (100)	2 (100)	0.001
Did hunger make you exhaust soon during labor	0	7 (10.9)	3 (60)	2 (100)	<0.001
Did you feel that if you would have had something orally your efforts could have been better during labor?	6 (25)	28 (43.8)	4 (80)	2 (100)	0.03
Average rate of cervical dilatation (cm/hour) and duration of labor					
From onset of labor until 4 to 6 cm dilatation of cervix (cm/hour) median (IQR)	0.75 (0.3-1.0)	0.40 (0.25-0.75)	1 (0.34-1.25)	0.27	0.10
After 4 to 6 cm dilatation till full dilatation of cervix (cm/hour) median (IQR)	2.5 (1.62-5.20)	2.55 (1.57-4.0)	2.25 (1.55-3.62)	3.75	0.93
Duration of first stage (hours)*	6.09	7.7	9	13.75	<0.001
Duration of second stage (minutes)*	15.54	23.6	30.6	19	<0.001

*Data expressed as mean. IQR-Interquartile range.

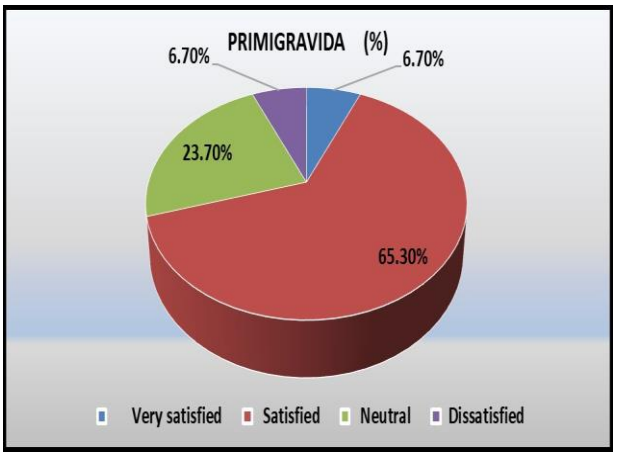

Figure 1: Response to satisfaction questionnaire in primi-gravidas.

Figure 1 depicts the response to oral intake satisfaction questionnaire in primi-gravidas. This figure shows that 23% of the responders had neutral satisfaction and 6.7% were dissatisfied with their oral intake during labor.

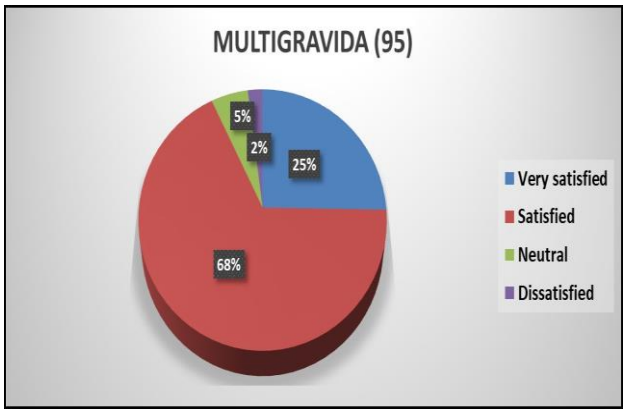

Figure 2: Response to satisfaction questionnaire in multigravidas.

Figure 2 depicts the response to oral intake satisfaction questionnaire in multigravidas. This figure shows only 5% of the responders had neutral satisfaction and only 2% were dissatisfied with their oral intake during labor. 25% of the responders were very satisfied with their oral intake during labor.

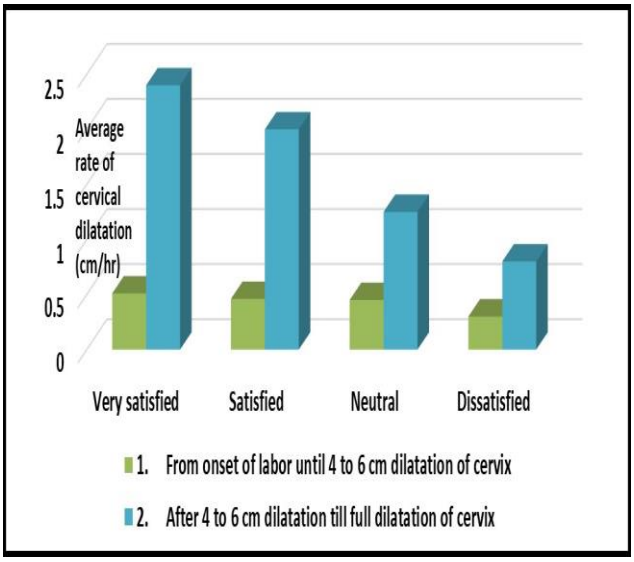

Figure 3: Cervical dilatation rates comparison with satisfaction of oral intake in primigravidas.

Figure 3 compares the cervical dilatation rates with oral intake satisfaction among primigravidas, which shows that the cervix dilatation rates and labor progressed faster in the very satisfied oral intake group compared to the dissatisfied group and neutral group. Thus, there is a positive impact of oral intake during labor on cervical dilatation rates and labor progression.

DISCUSSION

The oral intake taken by patients in our study were liquids in the form of milk, tea, fruit juice, coconut water and solids like bread, dahlia, banana, biscuits which were available in the hospital premises. Our hospital protocol encourages oral intake in low-risk laboring women. But due to restricted availability of food in the labor room, oral intake was limited and 62% of our study population felt that their labor efforts would have been better if they had better food intake.

In our study, 89 % of the primigravidas and 42% of the multigravidas had responded that if they had taken orally their efforts would have been better during labor and would have made a significant difference to their overall satisfaction with their oral intake during labor. In a study by Simpkin et al., 27% of the respondents considered restriction of food intake to be moderately stressful and 57% of the respondents reported restriction of fluid intake to be moderately or very stressful.[9]

Our study showed that the mean duration of the first and second stage of labor was prolonged compared to the patients who had very satisfied oral intake among the primigravidas and the difference was statistically significant (Table 3). Tranmer et al conducted a randomised control trial in Canada among 163 nulliparous women where one group of women received guidelines regarding food and oral intake and other group were permitted to have water, ice chips.[10] This study showed no statistically significant difference in the duration of labor between the two groups.

On comparing with a study by Parsons et al where the effect of eating in latent phase of labor with maternal and neonatal outcomes was studied in 176 nulliparous women which reported that eating in early labor was associated with longer labor averaging 2.16 hours whereas eating during latent and active phase resulted in prolonged labor of 3.5 hours. The difference between our study and this study could be owed to other unmeasured additional variables that may influence the length of labor which could have influenced the duration in their study. Our study was conducted among low-risk nulliparous women without any added risk factors whereas in this study the characteristics of the nulliparous women was not specified.[11] Our study showed that 20% and 32.7 % of primi-gravidas among the very satisfied and satisfied food intake group had nausea compared to 45% and 100% of the primigravidas in the neutral and dissatisfied group whereas vomiting was not enquired in our study (Table 3). A study was conducted by Scrutton et al in 1999 to analyse the detrimental effects of light, low residue diet or water only during labor.[12] In the low residue diet group, women were allowed to select from cereal, milk, toast, bread, biscuits, low fat cheese, semi-sweet biscuits with fluids like coffee, tea, fruit juice, milk, squash. The eating group was twice likely to have nausea and vomit around the time of birth than the water group. The difference in the findings of our study with this study could be due to other confounding factors.

The strength of our study is that this is the first kind of Indian study where the rate of cervical dilatation has been compared with satisfaction of oral intake in labor. The limitation of our study is that it was a hospital-based study.

CONCLUSION

Cervical dilatation rates in labor are affected by various factors, of which oral intake is an important contributing factor. Oral intake in labor is often neglected, thus causing prolonged labor duration and exhaustion among patients especially primigravidas. Adequate oral supplementation during labor has to be addressed and taken care of to prevent prolonged labor with exhaustion and dissatisfaction among patients.

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