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## **Evaluation of salivary sodium, chloride, magnesium and ionic calcium concentration in pregnant women**

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**Abstract**---Background” The purpose of this research was to examine the salivary groups of sodium chloride, magnesium, and calcium of unstimulated whole spit in pregnant women in three trimesters and compare the characteristics of non-pregnant women. Methods A longitudinal investigation. At the Acharya Vinoba Bhawe Rural Hospital in Wardha, India, 75 women who were pregnant or were in

the process of becoming pregnant and 75 women who were not pregnant were included in the study's sample of 75 pregnant and 75 non-pregnant women. Salivary Sodium, Chloride, Magnesium, and Ionic calcium concentrations were measured in unstimulated whole saliva. By using the Student t test and the ANCOVA, the data were examined (two-tailed  $\alpha = 0.05$ ). Results As the trimester progressed, the sodium, Chloride and ionic calcium concentrations continued to decline and magnesium levels were rising as the pregnancy progressed while the values in the non-pregnant women were in the normal range. Conclusion This research found differences in unstimulated whole saliva between pregnant and non-pregnant women.

**Keywords**---evaluation salivary sodium, chloride, magnesium ionic calcium concentration, pregnant women.

## **Introduction**

Females may experience hormonal changes that influence the whole body, including the oral cavity. Short-term changes in salivary flow rates, buffering capacity, and biochemical composition may occur during pregnancy, menstruation, and hormone replacement therapy [1–5]. Food and microbial clearance, mastication, digesting, lubrication, and protection are only few of the functions of saliva in the mouth [6,7]. A broad diversity of saliva compositions have been reported in both individuals and groups of persons, even though saliva is mostly water and organic and inorganic components. [2,6].

Pregnancy and hormonal changes on salivary features have been the subject of many research, the majority of which were carried out in European nations [6, 8], and certain criteria of normalcy are based on data from these populations. Literature on this subject is limited in Latin America. With keywords like "spit" and "pregnancy," an electronic library of health literature from Latin America and the Caribbean only found one item investigating salivary stream rates or perhaps pH in pregnant women. Another research on Latin American women was discovered by a similar search in PubMed MEDLINE [10]. A comparison of data from groups with possible genetic and nutritional variations is challenging because of these factors.

This cross-sectional research examined the levels of sodium, chloride, magnesium, and ionic calcium in the unstimulated whole spit of both pregnant and non-pregnant women. There may be a difference between pregnant women and non-pregnant women when it comes to the levels of sodium, chloride, magnesium, and ionic calcium in their saliva.

## **Methods**

It was decided that 75 women between the ages of 25 and 35 would participate in the test at the Acharya Vinoba Bhave Rural Hospital in Meghe Wardha. All of the participants had no history of xerostomia and were in good physical condition

when they went in for their routine exams. We studied a pregnant group consisting of 75 women who were all in one of three trimester stages at the time of the study (mean age: 27.9 years). High-risk pregnancies were ruled out, as were refusals to participate in the research due to their inherent risks. There were 75 non-pregnant women (mean age: 29.5 years old) in the comparison group, all of whom went to the same clinics for a routine examination. The college's institutional review board accepted the study protocol, which was in accordance with the Helsinki Declaration. There was a form of informed consent signed by each participant before to beginning the research.

### **Sialometrical analysis**

Whole saliva was collected between 07:30 and 10:30 am, at least one hour after the last meal, using the same protocols as before [11]. For five minutes, participants were instructed to sit still while they expectorated saliva into pre-weighed plastic containers. A gravimetric method was used to quantify the amount of saliva samples taken on ice. Because saliva has a specific gravity of 1.0, the volume (mL) of each saliva sample was equivalent to its weight (g). [12,13].

### **Sialochemical analysis**

Microbes and other incidental material were removed from the spit tests using centrifugation (radial power: 1,000 g). This liquid was used for biochemical testing to determine salivary sodium, chloride, magnesium, and ionic calcium concentrations, as stated in the next section. The CPC photometric method devised by Gitelman [14] was used to overcome the calcium problem in its whole. O-cresolphthalein complexone is bound to calcium particles in a basic media. CPC at 545 nm is used to estimate the response colorimetrically. The variety's power is shown to be inversely related to calcium concentration in the following example. The phosphomolybdate/UV technique was utilized to resolve inorganic phosphate by Daly and Ertingshausen [15,16]. Phosphorus and molybdate combine to generate a UV-retaining compound in this method. When ammonium molybdate interacts with inorganic phosphorus under the effect of sulfuric acid, a phosphomolybdate unreduced complex is generated.

### **Statistical analysis**

Student t tests were used to compare salivary sodium, chloride, magnesium, and ionic calcium concentrations across groups that included and did not include women who were or were not pregnant. pregnancy status was the defensible factor for ANOVA (pregnant versus non-pregnant). In all factual tests, a P-value of 0.05 was considered to be truly large for dismissing the incorrect hypothesis.

### **Results**

Sodium levels were declining as the trimester progressed with a statistical significance so also was the case with Chloride concentration. Calcium levels also decreased somewhat but were not statistically significant. Magnesium levels were on a rise as the pregnancy progressed but it was not statistically significant. All

values were within the parameters of worldwide norms of acceptable behaviour amongst non pregnant women.(Table 1).

Table 1  
Salivary Sodium, Chloride, Magnesium and Ionic Calcium concentration in pregnant and non-pregnant women

Variable	Pregnant first trimester (n = 25)		Pregnant 2nd trimester (n = 25)		Pregnant 3rd trimester (n = 25)		Non-pregnant (n = 22)		P*
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Ionic Calcium (umol/min)	8.37	1.3	7.11	1.04	7.01	1.06	8.8	2.4	0.63
Sodium (umol/min)	278.84	2.34	186.65	1.12	162.03	1.11	256.45	2.33	0.02
Magnesium (umol/min)	0.67	0.03	0.71	0.02	0.74	0.11	0.72	0.01	0.62
Chloride (umol/min)	201.02	2.03	183.03	1.23	107.36	2.23	288.02	2.04	0.01

\* ANOVA (for salivary Sodium, Chloride, Magnesium and Ionic Calcium)

## Discussion

We selected to collect unstimulated saliva because this kind of saliva is common throughout the day since it reflects the overall health of the body [17]. Unstimulated saliva is difficult to collect due of the impediment from natural boosts, which might affect a broad range of salivary flow rates. Nonetheless Consequently, a select few scientists prefer to work with spit that has been amplified. As part of an FDI-ordered audit, it was found that the average reference scope of stream paces is still in question. [17] The large range of salivary stream rates we discovered in our unstimulated salivary tests may have influenced our results, despite the fact that we followed standard procedures for the saliva tests [11].

As the trimester progressed, the sodium, Chloride and ionic calcium concentrations continued to decline and magnesium levels were rising as the pregnancy progressed while the values in the non-pregnant women were in the normal range. In addition, Laine [3] claimed that, contrary to popular belief, pregnancy does not cause considerable mineral loss from the teeth. Salvolini et al. [1] found that calcium levels dropped dramatically during the 21st and 40th seven-day periods of development and that phosphate levels dropped during the 21st week of growth. A rise in pH seems to have a direct effect on saliva sodium levels, according to a number of studies [18,19]. Even if a method for managing the electrolyte and mineral waste exists, the details are still hazy.

This study found that pregnant women had greater concentrations of magnesium however the difference was so tiny that it was not statistically significant. Magnesium production may be affected by pregnancy and other conditions [20].

There is a possibility that the magnesium levels have been altered by pregnancy-related hormone alterations since estrogen and progesterone production grows steadily until the eighth month and both substances modify the safe framework throughout the gestational period [3]. For women who were pregnant, the short duration of their monthly cycles was associated with an increase in salivary grouping of magnesium throughout pregnancy, delivery, and the postpartum period. Salivary flow rate had no effect on the level of magnesium, according to the researchers, since it was lower in pregnant women than in non-pregnant women. This link was shown to be true by the researchers. There may have been an increase in magnesium due to hormonal imbalances among pregnant women. While the study's cross-sectional methodology makes it hard to draw causal implications, data from prior examinations in other regions of the globe indicate some of the results. Pregnancy and non-pregnancy-related women in this Indian sample were both within normal ranges and did not vary significantly from values reported for other groups. There is a notable variance in timespans, which reflects the vast range of what is thought to be within the reach of the typical individual. Since these salivary limitations can not be used to detect fundamental illness and screen general health without large changes in attention, it is impossible to use them as outcome measures or biomarkers [21]. Pregnant ladies and non-pregnant women have little changes in outward appearances and would have no effect on clinical dental health management in these meetings. It is probable that the existing situation might change when analysing the consequences of high-risk pregnancy on some salivary boundaries in medically challenged women.

### **Conclusion**

Non-pregnant women did not vary significantly from pregnant women in saliva calcium, sodium, chloride, magnesium levels. The positive aspects of the salivary parameters evaluated were within the range of what would be considered normal over the globe.

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