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ORAL HEALTH STATUS OF PREGNANT WOMEN IN ILORIN, NIGERIA

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Keywords:	oral health, pregnancy, gingivitis in pregnancy, oral indices, ilorin

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Abstract

Oral diseases have been shown to negatively affect pregnancy outcomes, yet, a routine oral health care is not a component of the antenatal care package in Nigeria. This study was designed to describe the pattern of the oral conditions in pregnancy compared to the non-pregnant controls.

Two hundred and twenty-five pregnant women and 166 non-pregnant controls were studied from two health care facilities in Ilorin. Oral related complaints were assessed in the pregnant population while both of the groups had an oral cavity examination. The mean age of the respondents was 28.24 years ± 4.77 and 80% had at least a secondary school level of education. The prevalence of oral complaints among the pregnant women was 19.1%. Gingivitis was commoner among the pregnant women than the non-pregnant women, and more demonstrable on examination. Oral health care should be a component of the antenatal care in our environment.

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Impact statement

- **What is already known on this subject?** Women experience oral disorders in pregnancy, which may be worsened by the physiological changes in pregnancy.
- **What do the results of this study add?** This study has demonstrated a higher prevalence of gingivitis in the pregnant women than in the non-pregnant women on oral examination. The signs of gingivitis were higher than its related complaints.
- **What are the implications of these findings for clinical practice and/or further research?** Therefore, dental care and an examination should be part of a routine antenatal care package to prevent the unwanted pregnancy outcomes that are related to oral disorders.

Key words: oral health, oral indices, pregnancy, gingivitis in pregnancy, Ilorin.

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Introduction

Pregnancy is a physiological condition which is characterised by an increased production of reproductive hormones, such as oestrogen and progesterone, with resultant changes in all systems and parts of the body. For example, the Estradiol levels are up to 30 times higher in pregnancy and it regulates cellular proliferation, differentiation, and keratinisation, while progesterone affects the permeability of the microvasculature and collagen production (Yaghobi and Haghighati 2011). The adaptive changes are meant to support the developing foetus for a favourable outcome. The oral cavity is not spared of the endocrinological effects of pregnancy which tend to increase the incidence of dental diseases such as gingivitis and dental caries because of a low salivary pH (Tadakamadla et al., 2007); in addition, a presence of the high levels of oestrogen and progesterone aggravate gingival inflammation (Diaz-Guzman and Castellanos-Suarez 2004; Bressane et al., 2011).

Good oral health has been shown to be associated with a favourable pregnancy outcome (Shanthi et al., 2012) and there are possible relationships between oral diseases and pregnancy complications such as a premature birth, a low infant birth weight and pre-eclampsia (Rosell et al., 1999; Passini Junior et al., 2007). In pregnancy, the permeability of capillaries is higher and bleeding gums are more prevalent and this may affect an oral health status in pregnancy (Jensen 1999; Holder et al., 1999). Thus, tooth brushing becomes complicated, and the development of dental caries and periodontal diseases are further accentuated.

Pregnancy provides an opportunity for health awareness and a promotion for women as an important component of antenatal care. In Nigeria, an oral health assessment is not a routine

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component of antenatal care even though pregnant women also have oral problems that require treatment. An epidemiological description of baseline oral conditions would be important for any successful preventive programme in low resource settings. Unfortunately, such information is lacking and impairs confidence of health care givers in the management of such women.

The World Health Organisation's concept of a common risk factor approach suggests that the oral, as well as other medical disorders such as hypertension, diabetes mellitus, have similar predisposing factors (Sheiham and Watt, 2000). Therefore, a routine oral examination in pregnancy is an indirect modality of a medical screening in pregnancy, and a prevention of chronic disorders on a long term basis.

Studies have described the various patterns of an oral health status in pregnancy in the past; however, many did not compare their findings with the apparently healthy non pregnant controls in a low-resource setting like Nigeria, where socioeconomic factors have a significant impact on health. Thus, there is a need for an update on the current status of oral health in pregnancy and identify the other related factors in pregnancy. Most women do not seek health care except when sick or when pregnant, therefore findings may likely suggest the oral health status of women in this environment.

It is therefore important to assess the oral cavity status of pregnant women and compare with non-pregnant women to determine the existence of any abnormalities which are modifiable to the effective preventive measures. This study describes the oral symptoms and conditions in pregnancy and compares the oral findings in pregnant and the non- pregnant women in Ilorin, Nigeria.

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Materials and methods

This was a descriptive and cross-sectional study of the pregnant women that attended antenatal clinics of the University of Ilorin Teaching Hospital and Sobi Specialist Hospital, Ilorin, while non-pregnant women in the outpatient clinics of the same facilities were used as the controls. The health facilities were selected by a convenience sampling. The choice of specialist care setting as a study site was based on convenience and the volume of patients that satisfied the inclusion criteria. However, the selected study sites offer all levels of obstetric care (primary, secondary and tertiary) in the society by the virtue of their locations and staffing. The policy is meant to attract all women and reduce the high maternal mortality rates. Also, dental services are not available in the primary health facilities and are not readily offered at the secondary level of care.

Ilorin is the capital of Kwara State and has a population of about 1,600,000 that is multi-ethnic with social, cultural and economic diversities. The city comprises of Ilorin East, Ilorin West and the Ilorin South Local Government Areas of the state. The selected hospitals are located within the Ilorin East and West Local Government Areas.

This study was approved by the Ethical Research Committee of the University of Ilorin Teaching Hospital and Kwara State Ministry of Health. The participants gave an informed written consent before their administration of questionnaires and examination. The apparently healthy pregnant women that satisfied the inclusion criteria were recruited and were sampled randomly by a balloting during antenatal clinic visits. Eligible non-pregnant women without oral complaints were sampled as controls. The patients with underlying medical disorders such as Diabetes,

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Hypertension and lentiviral infections were excluded. The sample size was calculated with Fischer's formula for a descriptive study and the sample population comprised 225 pregnant women and 166 non-pregnant women.

Three dental surgeons were calibrated for an inter-examiner reliability prior to the commencement of the study and this was undertaken using ten patients to measure the oral indices. All of the examiners adhered to the standard operating procedures. The measurements obtained were subjected to the Cohen's Kappa statistics and correlation coefficient for inter-examiner reliability was 0.8. The structured and interviewer administered questionnaire was designed by the investigators, based on a review of previous literature, of expert opinion and of experience. The sections of the questionnaire were socio-demographic characteristics, pre-pregnancy and pregnancy oral health conditions, social history; findings on the oral cavity examinations were also documented. The reliability of the instrument was carried out via a pre-test in a pilot study in one of the study sites. Twenty (20) clients who participated in the pilot were excluded. The validity of the content of the questionnaire was assessed via an expert and peer review after the initial design.

Thereafter, oral examinations were performed in the respective clinics using a No. 05 clinical mirror and dental probe for the plaque and calculus Indices. The Simplified Oral hygiene index-S (OHI-S) was used to determine the oral hygiene status scored; determined as good if score was 0–1.2, fair = 1.3–3.0 and poor if 3.1–6.0. The dental caries were scored on the surface of all teeth in accordance with the WHO criteria with the DMF-T index which was recommended by Klein and co-authors (Vasiliauskiene 2003). The oral examination findings were recorded in the data sheet for each patient; and the oral findings and indices were then compared in both groups. A

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statistical analysis was performed with the software SPSS version 16. Descriptive statistics were reported as well as cross-tabulations. An inference on the cross-tabulations was performed, using the Chi-square tests and a *p* value of less than 0.05 was considered to be significant.

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Results

Two hundred and twenty-five pregnant women (225) were randomly sampled from the antenatal clinic attendees at the Sobi Specialist Hospital and the University of Ilorin Teaching Hospital, in Ilorin, Nigeria. The controls were 166 non-pregnant women from both facilities. The sociodemographic characteristics of all of the participants are shown in Table I. The majority (87.6%) were within an age range of 21–35 years old and the mean age of all participants was 28.8 years ± 4.77. Only 15 out of the total number of women had no form of formal education.

Approximately, seventy-five percent of the pregnant women were in their third trimester and had at least a parous experience. The socio-demographic characteristics of the controls who were not pregnant are also displayed in Table I.

Oral and related complaints in pregnancy

In an index pregnancy, there were oral complaints in 43 (19.1%) women and the commonest complaint made was bleeding gums in 10.2%, followed by painful gums, teeth and palate in 9.8%. A swollen gums was the least common complaint among 4.9% and only 10 women had experienced swollen gums in their past pregnancies. The frequencies of nausea, vomiting and of dietary change as oral related complaints are shown in Figure 1; a dietary change was commoner than nausea and vomiting in the respondents. Out of the 43 pregnant women with complaints, 12 (48%) respondents in first trimester, 8 (32%) in second trimester and 6 (24%) in the third trimester reported that such complaints predated an index pregnancy and became worse during the pregnancy, making a total of 26. Twenty-one women, 9.3% had been treated for oral diseases

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in the past when not pregnant. There was no significant statistical relationship between the nausea, vomiting and oral complaints in pregnancy ($\chi^2 = 1.747$, $p = 0.186$).

Oral findings on examination

The oral examination findings of the two groups are reported in Table II. Gingivitis was the commonest finding in both groups, with a higher prevalence among the pregnant respondents. Among the 103 pregnant women with gingivitis, 1.94% were in the first trimester, 25.2% in the second trimester while the majority (72.8%) were in the third trimester of pregnancy. There was no significant relationship between gingivitis and the gestational age at presentation in this study (x= 2.526, $p = 0.283$). Disguesia and ptyalism were significantly commoner in pregnancy, as well. Epulis/granuloma was found in only 4 (1.8%) pregnant women, while the only recorded diffuse capillary telangiectasia was found in a non-pregnant respondent. There was no identified apthous ulceration found in either group.

Simplified oral hygiene (SOH-I) and Decayed, Missing and Filled Teeth (DMF) indices of the respondents:

The oral hygiene of the pregnant women was better than the non-pregnant women and this was statistically significant (p <0.001) when assessed with OHI-S. Using the DMFT index, 87.6% of pregnant women and 80% of non-pregnant women had no carious experience. This difference was, however, not significant. There was also no report of a filled tooth among all of the study participants (see Tables III and IV).

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Discussion

The prevalence of oral complaints in pregnancy in this study was 19.1%, and such complaints included swollen, painful and bleeding gums. The prevalence of oral complaints in this study was lower than found in a report from Port Harcourt, Nigeria (Bashiru and Anthony 2014) but comparable with a report from Tanzania (Nwangosi and Kiango 2012). In a postnatal survey by Thomas et al. in Australia, 59.5% of respondents also had symptoms of gingivitis (Thomas et al., 2008) which is comparable with the oral findings in this study. Gingivitis was the commonest diagnosis on the oral examination in both the pregnant and non-pregnant participants; this further corroborates the oral symptoms reported. Also, 26 pregnant women had related symptoms prior to their pregnancy, it has been stated that the prevalence of periodontal conditions in Nigeria is high among all of the population (Akpata 2004). Generally, it is reported that some pregnant women perceive the conditions related to gingivitis as a normal occurrence in pregnancy. This misconception arises from an inadequate knowledge of the cause, and a poor oral hygiene worsened by the hormonal changes of pregnancy (Diaz-Guzman and Castellanos-Suarez 2004; Tadakamadla et al., 2007; Bressane et al., 2011). Therefore, complaints related to gingivitis were fewer than the actual findings on examination. Gingivitis was also more prevalent among the pregnant women than in the non-pregnant controls as an oral condition during examination; this further underscores the role of hormonal changes of pregnancy as an aggravating factor of the condition (Laine 2002). Hence, there is need for more interventions in developing societies where a routine oral and dental care is not part of the antenatal care despite the documented relationship between dental lesions and adverse pregnancy outcomes (Rosell 1999; Passini Junior et al., 2007; Shanthi et al., 2012).

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It was observed that the same proportion of patients that experienced swollen gums in index pregnancy had had similar experiences in a past pregnancy, supporting earlier findings of effects of pregnancy on the gingival inflammation as an aggravating factor in an underlying oral disorder before pregnancy. Gingivitis is the commonest oral problem in pregnancy (Kandan et al., 2011; Mahmud et al., 2014; Naseem et al., 2016); immunosuppression, hormonal fluctuations and changes in oral flora are the contributory factors. The gingiva may therefore become inflamed, painful and bleed (Vasiliauskiene 2003; Bashiru and Anthony 2014). This makes tooth brushing difficult resulting in plaque accumulation around the teeth and an increased risk of extraction during pregnancy.

The prevalence of disguesia and an excessive salivation in pregnant women compared to the non-pregnant women in this study agreed with the earlier findings of high prevalence of these pregnancy related complaints (Mahmud et al., 2014). Pregnancy is generally characterised by an excessive salivation, a loss of taste, nausea and vomiting due to a high level of HcG, oestrogen and progesterone elaborated from the placenta (Callahan and Caughey 2013). This study reported a low prevalence of caries in both the pregnant women and the non-pregnant women, even though certain organisms implicated in the cause of dental caries have been found to increase in the mouth during pregnancy (Tadakamadla et al., 2007). Although a caries incidence cannot be directly related to pregnancy, it has been found that DMF Index is higher in women who have had children than those who have not (Vasiliauskiene 2003). Some studies have shown that a low saliva pH among pregnant women may contribute to the worsening of carious lesions (Laine 2002). The mean DMF-T index of non-pregnant women was higher than the mean value observed in the pregnant women though without significant statistical difference, this can be explained by the low carious experience of the study population.

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The low prevalence of pregnancy epulis in this study was comparable to findings at the oral examination among pregnant women in Raichur India, and in Accra, Ghana (Annan and Naumah 2005; Gupta and Acharya 2016). Pregnancy epulis, also known as pyogenic granuloma, results from the interplay between the hormonal effects, gingival vasculature and a poor oral hygiene in pregnancy. This causes a chronic gingivitis that is commonly observed in the third trimester and resolves spontaneously at 1–4 weeks' postpartum. (Rabinerson et al., 2002; Saravanum et al., 2012). Epulis-like lesions outside a pregnancy are peripheral giant cell granuloma, a central giant cell granuloma and fibroma (Agrawal 2015).

The mean SOH- I in this study was 1.47 for the pregnant women and 2.0 for non-pregnant controls. The mean index score of the pregnant population reported by Gupta and others in a cross-sectional population study in India was less than 2.87 (Gupta and Acharya 2016). The pregnant women had a higher satisfactory index score than the control group, as shown in Table IV. The better oral hygiene score in the pregnant participants is most likely related to their high level of education and young age; education and a younger age are known to positively influence oral and dental care in pregnancy (Vogt et al., 2012; Onigbinde et al., 2014). The satisfactory oral hygiene in pregnancy further suggests that the observed oral conditions in this study were probably aggravated by the hormonal effects of pregnancy and may not necessarily result from a poor oral hygiene. Therefore, women should have a routine oral care in pregnancy even if there are no complaints so that fears and anxiety can be allayed. This will also limit unwanted interventions that may stem from assumed oral and dental problems when there are none.

This index study was hospital-based and described findings in the pregnant women that presented for antenatal care, thus excluding the other pregnant women in the community. In the

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same vein, the controls were also conveniently sampled when they presented in general out-patient clinics without dental complaints. In addition, it was cross-sectional; further prospective designs where women are re-examined after delivery would be likely to give more information on the specific pregnancy effects and outcome.

In conclusion, oral conditions occur in pregnancy like the general population and some predate pregnancy. Gingivitis was the commonest oral finding in the study population with a higher prevalence in the non-pregnant women than in the pregnant women. Furthermore, the better oral health status and lower incidence of the carious lesions in the pregnant group compared with the controls may be linked to their higher level of education. Women in our society need to access dental care. SOH-I was better in pregnant women than the non-pregnant controls and both groups also had a low prevalence of caries with a mean DMFT index < 1. The oral conditions in pregnancy may cause symptoms and even worsen underlying pathological conditions. A routine oral examination in pregnancy is therefore beneficial for an improved oral health status in the study setting among women.

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Declaration of interest statement: The authors report no declarations of interest.

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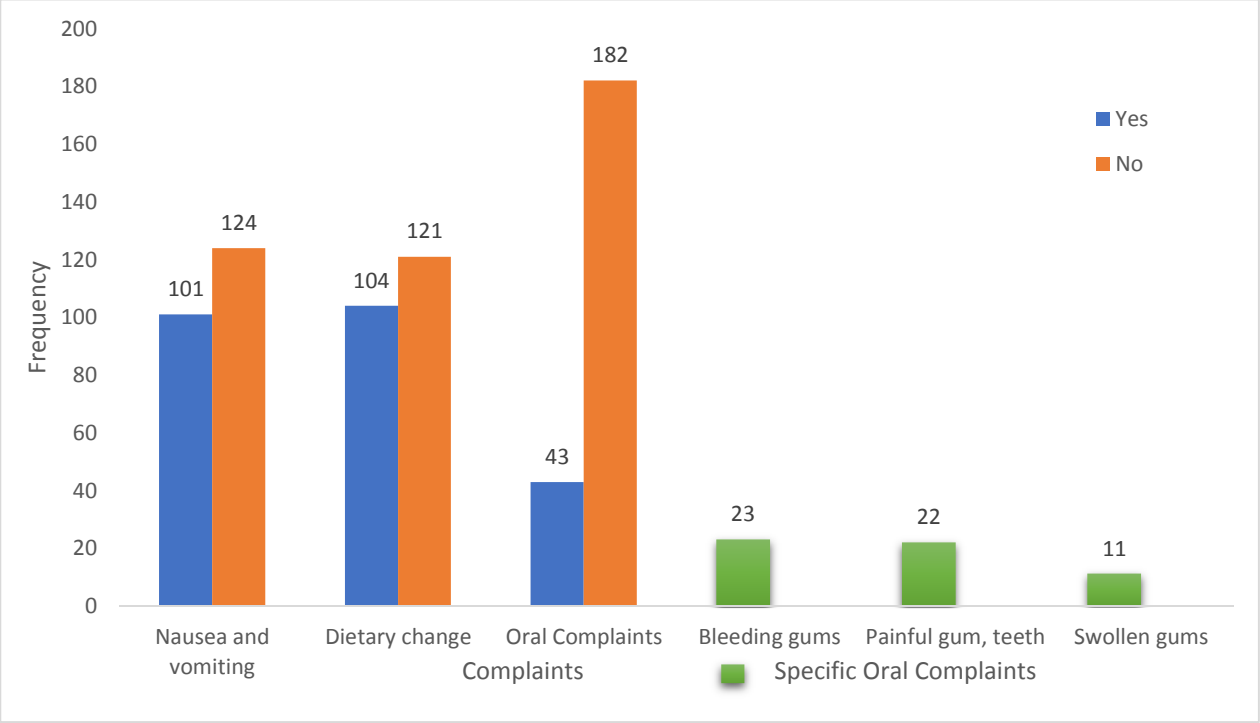
Figure 1. Oral and related complaints in index pregnancy



 Some patients had more than a complaint/mutually exclusive, specific complaints are shown in italics.

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Table I. Socio-demographic characteristics of participants

Characteristics	Pregnant (%) n = 225	Non-pregnant (%) n = 166
Age (years)		
≤ 20	9 (4.0)	29 (17.5)
21 – 25	54 (24.0)	45 (27.1)
26 – 30	90 (40.0)	49 (29.5)
31 – 35	53 (23.6)	22 (13.3)
36 – 40	18 (8.0)	14 (8.4)
> 40	1 (0.4)	7 (4.2)
Mean ± SD	28.83 ± 4.77	
Level of Education		
Primary	29 (12.9)	7 (4.2)
Secondary	50 (22.2)	24 (14.5)
Tertiary	140 (62.2)	126 (75.9)
Uneducated	6 (2.7)	9 (5.4)
Occupation		
Civil servant	82 (36.4)	34 (20.5)
Self employed	68 (30.2)	30 (18.1)
Artisan	23 (10.2)	11 (6.6)
Students	20 (8.9)	76 (45.8)
Unemployed	11 (4.9)	4 (2.4)
Others	21 (9.3)	11 (6.6)
Marital Status		
Married	223 (99.1)	91 (54.8)
Single	2 (0.9)	75 (45.2)
Gestational Age		
First trimester	8 (3.6)	
Second trimester	49 (21.8)	
Third trimester	168 (74.6)	
Mean ± SD (weeks)	31.92 ± 8.29	

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Parity	
Nullipara (0)	88 (39.0)
Primipara (1)	51 (22.7)
Multipara (2–4)	80 (35.6)
Grand Multipara (≥5)	6 (2.7)
Median	1.00

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Table II. Comparison of oral findings in pregnant and non-pregnant women

Oral Conditions	Pregnant n=225	Non-Pregnant n=166	χ^2	*p*
Pregnancy epulis/granuloma	4 (1.8)	0 (0.0)	2.982	0.084
Telangiectasia diffuse capillaries	0 (0.0)	1 (0.6)	1.359	0.244
Erosion	1 (0.4)	0 (0.0)	0.740	0.390
Severe gingival bleeding	1 (0.4)	2 (1.2)	0.725	0.394
Loss of taste	55 (24.4)	6 (3.6)	31.478	**<0.001**
Ptyalism/ Excessive salivation	80 (35.6)	2 (1.2)	60.009	**<0.001**
Burning sensation while swallowing	12 (5.3)	1 (0.6)	6.652	**0.010**
Gingivitis	103(45.8)	69(41.6)	0.688	0.407

$p<0.05$, significant

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Table III. Comparison of Simplified Oral Hygiene Index (OHI-S) and DMF Index of the two groups

OHI-S	Pregnant	Non-Pregnant	χ^2/t	*P*
0–1.2	113 (50.2)	44 (26.5)		
1.30–3.0	100 (44.4)	110 (66.3)		
3.1–6.0	12 (5.3)	12 (7.2)	22.408	< 0.001
DMFT				
Zero	197 (87.6)	134 (80.7)		
1–3	24 (10.7)	28 (16.9)		
≥ 4	4 (1.8)	4 (2.4)	3.475	0.176
Mean ± SD	0.29 ± 1.19	0.42 ± 1.00	-1.160	0.247

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Table IV. Distribution of missing and decayed teeth in the study population

Missing teeth	Subjects	Control	χ^2	ρ
0	197 (87.6)	134 (80.7)		
1	15 (6.7)	10 (6.0)		
2	6 (2.7)	12 (7.2)		
3	3 (1.3)	6 (3.6)		
4	1 (0.4)	3 (1.8)		
5	1 (0.4)	0 (0.0)		
6	1 (0.4)	1 (0.6)		
7	1 (0.4)	0 (0.0)	6.072	**0.531**[y]
Decayed teeth				
1	16 (57.1)	16 (64.0)		
2	3 (10.7)	5 (20.0)		
3	6 (21.4)	2 (8.0)		
4	2 (7.1)	2 (8.0)		
6	1 (3.6)	0 (0.0)	1.252	0.869[y]

[y]-Yates corrected result * no filled tooth

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