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Highlights

- Importance of Primary Dentition
- Benign Paroxysmal Positional Vertigo
- Effectiveness of Epley's Maneuver
- Determining Gonial Angle in Western UP

Discovering Thoughts, Inventing Future

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A Comparative Study to Assess the Effectiveness of Epley's Maneuver Vs Brandt Daroffs Home Exercises for Management of Benign Paroxysmal Positional Vertigo

By Dr. Shrinivas S. Chavan, Dr. Neeta Shinde, Dr. Abhishek Dilip Khond, Dr. Vitthal Kale & Dr. Snigdha Thakur

Abstract- *Background:* Vertigo is one of the most distressing symptom seen in patients encountered in clinical practice by otolaryngologist and neurologist. It results from dysfunction of vestibular system, among which most common is BBPV(benign paroxysmal positional vertigo). BPPV present with short episodes of vertigo lasting for few seconds, usually precipitated by change in head position. In BPPV, otoconia from utricles are thought to collect in semicircular canal making them abnormally gravity sensitive. BPPV is clinical diagnosis on the basis of typical history and Dix Hallpike testing. Dr. T Brandt and Daroff introduced Brandt daroff home exercises based on cupulolithiasis theory. In 1980, John M Epley introduced canalolith repositioning procedure of Epley in the treatment of BPPV. Because of lack of consensus regarding the optimal treatment maneuver, in our study we have compared the effectiveness of Brandt Daroff and Epleys maneuver.

Keywords: *dix hallpike test, brandt daroff home exercise, epleys maneuver, DHI (dizziness handicap inventory) questionnaire.*

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A Comparative Study to Assess the Effectiveness of Epley's Maneuver Vs Brandt Daroffs Home Exercises for Management of Benign Paroxysmal Positional Vertigo

Dr. Shrinivas S. Chavan [α], Dr. Neeta Shinde [σ], Dr. Abhishek Dilip Khond [ρ], Dr. Vitthal Kale [ω] & Dr. Snigdha Thakur [¥]

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Aim: To compare the effectiveness of Epley's maneuver and Brand-Daroff home exercises for treatment of benign positional paroxysmal vertigo at tertiary care hospital.

Materials and methods: A prospective interventional and comparative study was conducted. A total of 240 patients complaining of giddiness were evaluated in this format out of which 68 patients were diagnosed to have BPPV. Due to Covid-19 pandemic there was loss of follow up to some patients. Remaining 54 patients were enrolled in the study and divided into 2 groups group 1 and group 2 by chit allocation.

Group 1 Received Epley's maneuver and Group 2 Brandt-Daroff home exercises was given. The outcome of 2 groups compared with Dixhallpikes test and DHI (dizziness handicap inventory) questionare.

Conclusion: In the treatment of BPPV, Brandt-Daroff vestibular exercises are as effective as Epley canalolith repositioning maneuvers with a similar mean Dizziness Handicap Inventory (DHI) Score between the groups. Hence, according to patient's circumstances both treatments may be utilized.

Keywords: dix hallpike test, brandt daroff home exercise, epleys maneuver, DHI (dizziness handicap inventory) questionnaire.

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I. Introduction

Vertigo is one of the most distressing symptom seen in patients encountered in clinical practice by both otolaryngologist and neurologist alike (1).

Vertigo is defined as an illusion of either oneself or the environment rotating. It indicates involvement of angular motion sensing system, that is semicircular canals and their central projection.(2)

It mostly results from dysfunction in vestibular system such as is Benign paroxysmal positional vertigo (BPPV), vestibular neuritis, Meniere's disease, labyrinthitis, superior canal dehiscence syndrome, vestibular migraine. Among which most common is Benign paroxysmal positional vertigo (BPPV). (2)

Dix and Hallpikes (1952) coined the term Benign paroxysmal positional vertigo (BPPV) in view of associated benign origin and momentary (paroxysmal) burst of intense vertigo upon head movements (positional). (2)

BPPV presents with short episodes of vertigo lasting for a few seconds, usually precipitated by change in head positions with respect to gravity and associated with nausea, vomiting and nystagmus.(3)

It accounts for about 17 % to 20% of all vertigo cases. (3–5) The prevalence of disease is 11 -64 / 10000.(5) The mean age of incidence is fourth and fifth decades, however cases have also been reported in children.(6)

Unlike the other causes of giddiness BPPV and cervical spondylitis shows more inclination towards female population. (7,8)

In vestibular system among 3 semicircular canal the most commonly affected canal is the posterior semicircular canal (60-90%), followed by horizontal canal (5-30%) and rarely anterior canal. (3,9,10)

The propensity for accumulation of particles in posterior semicircular canal is postulated to be related to anatomical factors such as size of common crus, its position below the utricle when supine and its dependent position when both erect and supine. (2)

Otoconia are calcium carbonate crystals embedded in macula of utricle and saccule. they have a greater density than surrounding endolymph thus making the macula sensitive to changes in angular acceleration. (2)

In BPPV otoconia from the utricle are thought to collect in semicircular canal, making them abnormally gravity sensitive, this results in abnormal displacement of cupula and stimulation of corresponding vestibular afferents. which cause abnormal eye movements and vertigo.

BPPV is a clinical diagnosis as it lacks any objective test till date. BPPV is diagnosed with clinical history and Dix Hallpikes test. Further Dix Hallpikes test helps in determining the primarily affected canal, as the direction of nystagmus determines the affected canal. Determination of affected canal is the most important facet in the treatment of BPPV. Recent literature by Brandt, Daroff, Epley, Norre, Beckers, and McCabe have proposed several other maneuvers based on cupulolithiasis and canalolithiasis theories for BPPV treatment (11–13).

Dr T. Brandt and R.B. Daroff introduced Brandt Daroff home exercises based on the cupulolithiasis theory of BPPV in 1980. The goal of these exercises was to loosen and disperse otoconia from the cupula of posterior semicircular canal. Brandt Daroff exercises were originally designed to habituate the CNS to the provoking positions, but they may act by dislodging debris from the cupula or by causing debris to move out of the canal. Presently, canalolith repositioning procedure of Epley is the most widely used maneuver for the treatment of posterior canal BPPV, which was developed by John. M. Epley and was first described in 1980. This aims to transport otoconia out of the canal towards the utricle with instant symptom resolution. (14)
Although there are many studies on efficacy of Epley's maneuver in the treatment of BPPV but little attention has been given to possible role of Brandt Darrof home exercises and there is lack of consensus regarding the optimal treatment maneuver.

In this study we have compared the effectiveness of Epley's maneuver and Brandt-Daroff home exercises for treatment of benign paroxysmal positional vertigo.

II. Aim

To compare the effectiveness of Epley's maneuver and Brandt-Daroff home exercises for treatment of benign positional paroxysmal vertigo (BPPV) at tertiary care hospital.

III. Materials and Methods

a) Study Design

This was a prospective interventional and comparative study of 240 patients who had complaint of giddiness, which was conducted in Department of Otorhinolaryngology in Grant Government Medical college and Sir JJ Hospital, Mumbai, India between February 2020 and November 2021. After receiving Institutional Ethical committee Clearance and informed written consents, Patients with symptoms suggestive of giddiness were screened and subjected to detailed clinical history (presentation of vertigo, predisposing factors, duration, recurrence of vertigo, accompanying hearing loss, tinnitus, sense of ear fullness, and sound intolerance). Patients were also questioned about neurologic symptoms, for example, headache, facial paralysis, change in mental status, slurred speech, loss of power, and syncope. All the patients were scored based on Dizziness Handicap Inventory scale (DHI)(15). Further these patients underwent a thorough physical examination which included general otolaryngological, neurological examination, and Dixhallpikes maneuver.

A total of 240 patients complaining of giddiness were evaluated in this format out of which 68 patients were diagnosed to have BPPV. Due to Covid-19 pandemic there was loss of follow up to some patients. Remaining 54 patients were enrolled in the study.

b) Inclusion Criteria

- Patient who are willing to participate after receiving their written consent.
- Patients of age more than 18 years with either gender attending ENT Out-patient Department.
- Patients whose medical history suggests Benign Positional Paroxysmal Vertigo (BPPV)

c) Exclusion Criteria

- Patients who are less than 18 years of age.
- Middle ear infections, cases with otorrhea, chronic otitis media and inner ear infections
- Patients with life threatening conditions like Myocardial Infarction, unstable Cardiac diseases, uncontrolled HTN, high grade carotid stenosis, severe rheumatoid arthritis.
- Patients with cervical spine dysfunction
- Recent neck trauma/orthopaedic disorder that impairs functional neck and trunk range motion.
- Pregnant women beyond 24 week gestation
- Patients with positive cerebellar signs
- Patient who are not willing to participate and have given negative consent

Further these patients were randomly divided into 2 groups based on chit allocation technique.

Patients in group 1 were subjected to Epley's maneuver and Patients in group 2 received Brandt Darrof home exercises as modality of treatment.

Vestibular suppressant medications if any were withheld 7 days prior to start of these maneuvers.

Proper instructions such as purpose safety measures, comfort, precautions and psychological

support were given to the subjects. Both group 1 and 2 were involved for pre- test assessment.

All patients in group 1 and group 2 were followed up at 1week, 4weeks and 3rd month. On each follow up day patients were subjected to a similar DHI (Dizziness Handicap Inventory) questionnaire and Dix Hallpike testing.

d) Data Analysis

All the collected data was entered in Microsoft Excel sheet. It was then transferred to SPSS ver. 20 software for statistical analysis. Quantitative data was presented as mean and standard deviation and comparison of the two study groups was done using unpaired t-Test. Pre-test and post –test quantitative data of each method was compared using paired t-Test. Qualitative data was presented as frequency and percentage and analysed using chi-square test.

IV. Observations and Results

In our study a total of 54 patients of BPPV were assessed over a total study duration of 21 months. These 54 patients were then randomly divided into 2 groups of 27 each.

Group 1: Received Epley's maneuver

Group 2: Brandt- Darrof home exercises was given.

a) Demographic distribution

Age wise distribution

Majority of the patients (36%) in Group 1belonged to 5th decade with maximum age 77 years and minimum age being 19 years. The mean age of the patients in group 1 was 41.76 years.Majority of the patients (48%) in Group 2 also belonged to 5th decade with and minimum age being 19 years and maximum age 75 years. (Table 1)

The mean age of the patients was 41.48 years. On comparing the 2 groups based on mean age distribution, there was no significant difference between the 2 groups as per Student t-test (p>0.05). and hence they were comparable.

Table 1: Distribution of patients according to Age

Age (years)	Group 1		Group 2		p Value
	N	%	N	%	
18-20 years	1	4%	3	12%	>0.05
21-30 years	4	16%	2	8%	
31-40 years	7	28%	4	16%	
41-50 years	9	36%	12	48%	
51-60 years	1	4%	2	8%	
61-70 years	2	8%	1	4%	
71-80 years	1	4%	1	4%	
Total	25	100%	25	100%	
Mean ± SD	41.76 ± 14.25		41.48 ± 13.67		

Group 1 constituted of 8 males (32%) and 17 females (68%) patients, whereas Group 2 had 6 males (24%) and 19 females (76%) patients. On comparing the male: female proportions in the two groups, there was no statistically significant difference as per Chi Square test. (Table 2)

Table 2: Distribution of patients according to Sex

Sex	Group 1		Group 2		p Value
	N	%	N	%	
Male	8	32%	6	24%	>0.05
Female	17	68%	19	76%	
Total	25	100%	25	100%	

b) *Distribution of patients according to Comorbidities*

6 (24%) patients in Group 1 had diabetes mellitus while 5 (20%) and 3 (12%) patients had hypertension and ischemic heart disease respectively.7 (28%) patients in Group 2 had diabetes mellitus while 4 (16%) and 2 (8%) patients had hypertension and ischemic heart disease respectively. There was no significant difference between the groups as per Chi-Square test ($p>0.05$).(Table 3)

Table 3: Distribution of patients according to Comorbidities

Comorbidities	Group 1		Group 2		p Value
	N	%	N	%	
Diabetes Mellitus	6	24%	7	28%	>0.05
Controlled Hypertension	5	20%	4	16%	
Ischemic Heart Disease	3	12%	2	8%	

c) *Distribution of patients according to associated Symptoms*

20 (80%) patients in Group 1 had tinnitus while 7 (28%) and 5 (20%) patients had otalgia and impaired hearing respectively. 21 (88%) patients in Group 2 had tinnitus while 8 (32%) and 2 (8%) patients had otalgia and impaired hearing respectively. There was no significant difference between the groups as per Chi-Square test ($p>0.05$). Hence they were comparable. (Table 4)

Table 4: Distribution of patients according to symptoms

Symptoms	Group 1		Group 2		p Value
	N	%	N	%	
Tinnitus	20	80%	21	88%	>0.05
Otalgia	7	28%	8	32%	
Impaired hearing	5	20%	2	8%	

d) *Comparison of Dix Hallpikes Test between 2 groups during follow-up*

During 1st week follow-up, 10 (40%) of Group 1 had positive Dix-Hallpike Test which reduced to 3 (12%) patients during 4th week and 3rd month follow-up. There was significant improvement in patients of Group 1 during follow-up period as per ANOVA test ($p<0.05$). During 1st week follow-up, 13 (52%) of Group 2 had positive Dix-Hallpike Test which reduced to 5 (20%) patients during 4th week follow-up. 2 had negative Dix-Hallpike Test in 3rd month follow-up. There was significant improvement in patients of Group 2 during follow-up period as per ANOVA test ($p<0.05$). However, there was no significant difference between the groups as per ANOVA test ($p>0.05$). (Table 5)

Table 5: Comparison of Dix Hallpikes Test between groups during follow-up

Dix Hallpikes Test		Group 1		Group 2		p Value
		N	%	N	%	
1st Week	Positive	10	40%	13	52%	>0.05
	Negative	15	60%	12	48%	
	Total	25	100%	25	100%	
4th Week	Positive	3	12%	5	20%	>0.05
	Negative	22	88%	20	80%	
	Total	25	100%	25	100%	

3rd Month	Positive	3	12%	0	-	>0.05
	Negative	22	88%	25	100%	
	Total	25	100%	25	100%	
p value		<0.05		<0.05		

e) *Comparison of Dizziness Handicap Inventory (DHI) Score between groups*

The mean Dizziness Handicap Inventory (DHI) Score of Group 1and Group 2 was 34.32±12.12 and 35.28±13.72 respectively. The difference between the groups was statistically not significant as per Student t-test (p>0.05). Hence they were comparable. (Table 6)

Table 6: Comparison of DHI Score between groups

	Group 1		Group 2		p value
	Mean	SD	Mean	SD	
DHI Score (Day 0)	60	12.70	58.92	12.2	>0.05
DHI Score (1st week)	54.2	13.7	54.88	14.47	>0.05
DHI Score (4th week)	42.72	14.9	43.04	15.89	>0.05
DHI Score (3rd month)	34.32	12.12	35.28	13.72	>0.05

V. Discussion

The aim of the study is to compare Epley's and Brandt Daroff home exercise in the treatment of BPPV. We divided the patients into two groups of 27 each based on chit allocation technique. The success was measured in terms of recovery from vertigo which was confirmed by Dix Hallpike test and DHI score on each follow-up.

In our study of 240 patients, 54 patients were diagnosed to have BPPV on the basis of clinical history, physical examination and Dix Hallpikes maneuver which accounted for 22.5% as Indian population has nutritional deficiency leads to osteopenia which causes dislodgement of otoconia from utricle. Similar results were seen by Bhattacharyya N et al, Froehling DA et al.(4,5)

The mean age group of patients were 41.48± 13.67 years. There was no significant difference between two groups as per student t- test. This is comparable with the study of Gaur S et al.(6)

In our study, Group 1 constituted of 8 male (32%) and 17 female (68%) patients. Whereas Group 2 had 6 male (24%) and 19 female (76%) patients. There was no statistically significant difference between the groups as per Chi-Square test (p>0.05), female: male ratio-2.5:1. This is similar to the studies of Bhattacharyya N et al(4)and Bronstein AM et al(16). They observed females are approximately 2 times more likely to experience BPPV than males as the present study showed majority of the cases were predominantly females in both the groups. This can also be related due to endocrinal and degenerative changes causing otoconial debris, which float freely and find their way into the semicircular canals, causing BPPV.

It was observed in the present study that 6 (24%) patients in Group 1 had diabetes mellitus while 5 (20%) and 3 (12%) patients had hypertension and ischemic heart disease respectively. 7 (28%) patients in Group 2 had diabetes mellitus while 4 (16%) and 2 (8%) patients had hypertension and ischemic heart disease respectively. There was no significant difference between the groups as per Chi-Square test (p>0.05).

Similarly no statistically significant association was observed by Saxena A et al (17) in each comorbid illness i.e. hypertension, diabetes mellitus, ischemic heart disease and cerebrovascular stroke (cardiovascular diseases) with either group (BPPV vs. non-BPPV)

It was observed in our study that 20 (80%) patients in Group 1 had intermittent non-pulsatile tinnitus while 7 (28%) and 5 (20%) patients had otalgia and impaired hearing respectively. 21 (88%) patients in Group 2 had intermittent non-pulsatile tinnitus while 8 (32%) and 2 (8%) patients had otalgia and impaired hearing respectively. There was no significant difference between the groups as per Chi-Square test (p>0.05). This is comparable to the studies of Saxena A et al(17) which stated that the association of intermittent non-pulsatile tinnitus with the BPPV group was found to be statistically significant but impaired hearing, otalgia and ear discharge were not significantly associated with either group i.e. BPPV vs. non-BPPV.

In our study, according to Dix-Hallpike Test during 1st week follow-up, recuperation rate was 60% in Group 1 which increased to 88% in 4th week. And in and 3rd month follow-up recovery rate was 100% in group 1. This was found to be significant as per ANOVA test ($p<0.05$). Similarly, in Group 2 recuperation rate was 48%, 80% and 100% in 1st week, 4th week and 3rd month respectively. when compared between recuperation rate of both groups there was no statistically significant difference on each follow up. Success rates between 80 and 100% have been reported for reposition maneuvers in BPPV. (18)These observations were similar as noted in the studies of Saxena A et al(17), Cohen HS et al(19), Mani P et al(20), Mohamad Hanapi NH et al(21), Choi SY et al(22) and Pavithralochani V et al(23).

The mean dizziness Handicap Inventory (DHI) score of Group-1 at day 0 was 60 ± 12.70 and at the end of 1st week, 4th week and 3rd month was 54.2 ± 13.7, 42.72± 14.9 and 34.32±12.12 respectively. For Group- 2, DHI Score at day 0 was 58.92± 12. 2 and at the end of 1st week, 4th week and 3rd month was 54.88 ± 14.47, 43.04± 15.89 and 35.28± 13.72 respectively. This was found to be statistically non-significant as per Student t- test (p-value >0.05) and hence they are were comparable. Similar observations were noted in the studies of Saxena A et al (17), and Cohen HS et al(19).

VI. Conclusion

- In our study we found female preponderance in BPPV, this could be attributed to endocrinal changes and nutritional deficiency in females.
- In the treatment of BPPV, Brandt-Daroff vestibular exercises are as effective as Epleycanalolith repositioning maneuvers with a similar mean Dizziness Handicap Inventory (DHI) Score between the groups. Hence, according to patient's circumstances both treatments may be utilized. In this Covid era patients hesitate to visit OPD for follow up, Hence Brandt Darrof home exercises can also be used as a modality of treatment with equal efficacy and more effective to build up confidence of patients.

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Evaluation of Parents Knowledge and Attitude Regarding the Importance of Primary Dentition based on their Socio Economic Status- An Original Research

By Sheetal Akula, Aditi Ramesh, Mohammed Tariq, Mohammed Hafeez Ur Rahman, Yamini Chandra & Durga Bai Yendluri

Abstract- Aim: To assess parents' attitudes towards the dental health of their children, considering the role of the family's socioeconomic background.

Materials and Methods: A questionnaire was formulated based on the literature review and the objective of the study and was self-administered to 400 parents, oral examination of the child was performed using WHO dentition status and treatment needs. Chi-square test was used for analysis.

Results: The knowledge of parents regarding primary teeth was based on their socioeconomic status. A majority of parents from group II reported that primary teeth stay for 3 to 6yrs of age in contrast to parents from group V who said that primary teeth would remain till 12 yrs of age. A statistically significant difference was found between the various socioeconomic groups (p=0.000).

Keywords: *socioeconomic status, parents, oral health, behaviour.*

GJMR-J Classification: *DDC Code: 330.973 LCC Code: HC106.5*

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Conclusion: This study highlights the importance of prevention to combat dental caries. Prevention programs should target specific groups. However, the best strategy depends on several factors, including cultural, economic, and geographic factors and it is noted that the most suitable method depends on local factors.

Clinical Significance: During a child's early period of primary socialization, the routine dietary and health behaviour is usually established. This behavious is both directly and indirectly influenced by the knowledge, attitudes, beliefs and practices regarding oral health of their parents and caregivers. Hence, behavioral and social factors such as attendance patterns, parents' perceptions of their children's dental anxiety, and the socioeconomic status of the family may influence the parental attitude to dental care.

Keywords: *socioeconomic status, parents, oral health, behaviour.*

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I. Introduction

During a child's early period of primary socialization, their routine dietary and health behaviors are usually established. These behviors are both directly and indirectly influenced by the knowledge, attitude, belief and practices towards oral health of their parents and caregivers. Dental health education begins in the footsteps of awareness. Growing children need proper guidance for healthy growth, upkeep and hygiene of their teeth. Poor oral health in early childhood is one among the most grave and expensive health conditions in young children. The major concern is that of decay in the deciduous dentition. Untreated dental caries can affect body weight, growth and quality of life in preschool children[1]. In various studies, Caries experience in early childhood has been linked to caries experience in permanent dentition[2]. Socioeconomic Status (SES) is an essential determinant of the standard of living and health status in the population. It primarily influences the incidence and prevalence of various health conditions. Socioeconomic status also affects social security as it plays a critical role in accessibility, affordability, acceptability and utilization of health facilities. In dental health, the socioeconomic status has been recognized for years as the primary factor for inequality[3]. In different areas in the western world, oral diseases has been shown to be more frequent in the lower socioeconomic groups, with the more affluent having lower experience of oral diseases[4]. There have been several attempts to develop different scales to measure socioeconomic status but Prasad's classification[5] (1961) based on the per capita monthly income and later modified in 1968, 1970, 2013

has been extensively used in the Indian scenario and has been quite effective in performing the task under discussion [6,7,8]

The dental attitudes may be influenced by the behavioral and social factors of the population such as attendance patterns, parents' perceptions of their children's dental anxiety and the socioeconomic status of the family. The concept of socioeconomic inequalities in oral health can be defined as differences in the prevalence or incidence of oral health problems between individual people of higher and lower socioeconomic status. In the recent studies, health inequalities have been given a new impetus by the development and increasing use of measures of socioeconomic status. Inequalities in health are evident in all countries for which data are available[9]. Within less developed countries, there is a clear relationship between average per capita income and health status measures such as life expectancy[10]. A substantial body of scientific literature from many countries has shown that the oral health of lower socioeconomic status groups is worse than their higher socioeconomic status counterparts. Unfortunately, very little information has been found in the literature to show that a family's socio economic background is related to attitude for the dental care of their children. So this study was conducted to assess parents' attitudes to the dental care of their children, taking into account the family's socioeconomic background.

II. Methodology

A descriptive cross-sectional epidemiological survey was conducted among parents and their children between the age groups of 4 to 6 years who were enrolled in primary schools of Vikarabad mandal.

A questionnaire was formulated based on the literature review and the study's objective and pilot was conducted on a sample of 30 parents. Necessary modifications were made to design the final proforma and validated using Cronbach's alpha which was found to be 0.72. Prasad's classification (2013) of socioeconomic status for rural and urban populations was used to classify the socioeconomic status of the parents. With a relative precision of 15%, the final sample size of 400 was calculated. Out of 66 primary schools using simple random lottery method, 16 schools were selected, and the survey was spread over a period of 4 months from January 2021 to April 2021. Clinical examination of the child was performed using WHO dentition status. On the day of the survey, information from parents who have come to the school and who were willing to participate was obtained by a self-administered questionnaire given to them on the school premises after explaining the purpose of the study in detail.

Dentition status and treatment needs of the child were recorded using a plane mouth mirror and CPI probe in the school premises in front of the parents.

III. Results

A total of 400 children received the oral examination, and 400 parents filled the questionnaire during the survey with a response rate of 100%.

About 15.8% of parents belonged to socioeconomic group I with an income of INR. 5156 - above, 21.5% belonged to group II with an income of INR 2578-5155, 19.8% belonged to group III with an income of INR 1547-2577, 23.5% in group IV with an income of INR 773-1546 and 19.5% in group V who had an income of less than INR 773. Many a parents belonged to the socioeconomic group IV and lowest number of parents belonged socioeconomic group I. The self-reported dental questionnaire of the parents and the children based on financial status of the family revealed that a majority of the parents (59) were from SES group IV who had never been to a dentist, whereas only 29 parents from the SES group I had never been to a dentist before. There was a significant difference of $p=0.002$ between all the socioeconomic groups in relation to their past dental visit. A maximum of SES group III parents had satisfactory dental experience while very few (10) parents from group V had satisfactory past dental experience which was statistically significant 0.0027 between all the socioeconomic groups. Many of parents from group II reported that their past dental experience would affect them in taking their child to a dentist. When the effect of subjective experience of the child with a dentist was considered between all socioeconomic groups, there was no statistically significant difference ($p=0.083$). The majority of (38) parents from group III, said that milk teeth don't need any treatment in comparison to a very few of 19 parents from group I agreed with the same and values were statistically significant where $p=0.002$ between all the socioeconomic groups, and it is both the parents who collectively decide about the dental care of their child. There was a significant difference regarding the decision-maker between all socioeconomic groups ($P=0.021$). A Maximum of 14 and 12 children from group III, IV respectively had previously missed the school because of dental problems. However, the values were not statistically significant between all the socioeconomic groups i.e., $p=0.445$ concerning to child's absence from the school because of dental problems.

The parents' knowledge regarding primary teeth based on their socioeconomic status in which majority of parents from group II reported that primary teeth stay for 3 to 6yrs of age in contrast to parents from group V said that primary teeth would stay till 12 yrs of age. A statistically significant difference between the various

socioeconomic groups (p=0.000) was observed. Parents from group II said that the child would have difficulty in chewing food, group I parents agreed that permanent teeth will be affected were as parents from group V told that there would be no effects of early loss of primary teeth. The values were statistically significant 0.000 in between all the socioeconomic groups regarding parents' knowledge on primary teeth.

Parental care towards child's oral health based on their socioeconomic status was observed in which it was noted that, a majority of the parents from group III preferred to take their child for a regular dental check-up followed by group II parents, whereas group IV and group V parents preferred to have a dental check-up only when the child had any dental problem. A Majority of the parents from group I initiated tooth brushing six months after the tooth started erupting, in contrast, a majority of parents from group IV initiated tooth brushing 1yr after the tooth started erupting. The values were statistically significant i.e., p=0.000 between all the socioeconomic groups when the initiation of tooth brushing of the child was considered. The majority of the parents from groups II and III said that a regular dental check-up, proper brushing and rinsing the mouth, and avoiding sweets in between meals would prevent their child from dental caries. In contrast, only very few of (9) parents from group V agreed with this statement. The values were statistically significant i.e., p=0.000 between all the socioeconomic groups regarding the preventive methods considered to prevent dental caries.

In the 1st scenario, where a black spot is seen on the tooth, but the tooth is not painful, majority of the parents from group IV and V preferred to ignore it. At the same time, parents from group I and II preferred to start supervised brushing and also leave the treatment decision to the dentist in treating the asymptomatic carious teeth. There was a significant difference between all the socioeconomic groups regarding attitude towards asymptomatic carious tooth (P=0.000). In the 2nd scenario, where the teeth are symptomatic majority of parents from group IV preferred to either ignore or relieve the symptoms and monitor the tooth. In contrast, a majority of the parents from group II chose to leave the treatment decision to the dentist. The values were statistically significant i.e., p=0.000 between all the socioeconomic groups regarding the attitude towards treating any symptomatic carious tooth. About 29 parents from group II said that they would ask for other alternative treatments if the dentist suggests for extraction of a symptomatic carious tooth. The values were statistically significant i.e., p=0.000 between all the socioeconomic groups regarding the importance given to the primary teeth by the parents. Parents from group II agreed that early loss of milk teeth is always harmful to permanent teeth and only very few that is 4 parents from group V agreed with it, and the values were statistically significant p=0.000 between all the socioeconomic groups.

Parents from group IV agreed that sweets and chocolates are highly responsible for dental caries. The values were statistically significant i.e., p=0.019 between all socioeconomic groups regarding the knowledge on cariogenic food. A maximum of 28 parents from group V said that caries always transfer from tooth to tooth, while only 17 parents agreed with the same. There was a significant difference between all the socioeconomic groups p=0.0024 regarding knowledge on transfer of caries from tooth to tooth.

The DMFT and carious status of the child based on SES of the parent was assessed, in which maximum DMFT score of 12 was found in children belonging to SES group V with a mean score of 1.46 (SD 2.42) and a least score of 8 was found in SES group III children with a mean of 1.22 (SD 2.01).

The number of carious teeth in children based on their family's socioeconomic status was noted, where children belonging to SES group IV had maximum carious teeth of 46 followed by 33 carious teeth in group V children and a least score of 14 was found in children belonging to SES group I followed by group II where only 21 children had carious teeth. When the number of carious teeth was compared to the parents' socioeconomic status, a significant difference was found between all the SES group children (P=0.001).

On assessing, the parental care towards child's oral health based on the carious status of the child, it was observed that parents who preferred taking their child to a dentist as soon as the teeth erupt had the least i.e., 3 carious teeth, in comparison to parents who chose to take their child to a dentist only when the child had any dental problem were a maximum i.e., 88 carious teeth were present. However, the values were not statistically significant 0.393 between the opinions of the parents for their child's 1st dental check-up. Children whose parents had initiated tooth brushing immediately after the 1st tooth erupted had the least carious teeth when compared to children whose parents had initiated tooth brushing 1 yr after the teeth had erupted. There was a significant difference between opinions of the parents (p=0.009) regarding the initiation of the tooth brushing. Parents who preferred regular dental checks for their child to prevent dental caries had the least carious teeth than parents who chose proper tooth brushing and rinsing the mouth. Still, there was no significant difference 0.212 between the preventive measures followed by the parents to prevent dental caries.

When parental attitude towards the carious teeth to that of the carious status of the child where a maximum of 67 carious teeth were found among children whose parents chose to ignore asymptomatic carious tooth but the parents who preferred to leave the treatment decision to the dentist had less score, and

there was a significant difference p=0.037 between the attitude of the parents in treating an asymptomatic carious tooth. In the second scenario, where the tooth is painful maximum of 147 carious free teeth were found among the children whose parents left the treatment decision to the dentist than the parents who preferred either ignoring the tooth or tried relieving the symptoms and monitoring the tooth and the values were statistically significant i.e., p=0.041 regarding the attitude of the parents towards the care of a symptomatic carious tooth.

IV. Discussion

Oral health habits established during early childhood are maintained and are important for oral health conditions later in life. Young children acquire their health behavior from the environment, and their oral health relies on the parents and support from the dental services. Possible characteristics of parents associated with caries risk in children could be demographic factors of the family[11]. Children are dependent on their environment to establish favorable health behaviors, and young children's dental health relies on the parents' involvement and support from the dental services[12].

The distribution of young children according to caries experience in the deciduous dentition is skewed in the most developed countries. In young children, principal risk factors, such as, diet, the transmission of pathological microorganisms, and oral hygiene, are determined by family values, daily practices, and lifestyles. For young children, who do not make independent decisions, these factors are determined by family values, traditions and lifestyle, which in turn are related to their culture and social class. Factors related to parental norms, knowledge, attitudes, and behavior have been associated with parental abilities, especially the mother's ability to promote adequate dental health behavior in their children[13,14] .

Social class may affect caries risk in many ways. Low income affects education, health, values, lifestyles, and access to health care information, thereby increasing susceptibility to caries. Understanding the socioeconomic status (SES) of the community is extremely imperative in order to correlate its impact on health and quality of living standards of that community. The critical determinant of the standard of living and health status is socioeconomic status of the individual/community. The incidence and prevalence of various health-related conditions is directly influenced by socioeconomic status. It not only influences the social security in terms of the accessibility, affordability, acceptability but also has an impact over actual utilization of various health facilities. Numerous different scales to measure the socioeconomic status in both rural and urban areas have been recommended in the literature by several experts. However, Prasad's classification (2013)[15] based on the per capita monthly income has been widely in use in India. The advantage with Prasad's classification is that it takes into consideration only the income as a variable and it is simple to calculate.

In the present study the parents' perception regarding primary dentition and their preference regarding dental care of children taking into consideration the family's socioeconomic background has been examined. Despite the variation in the prevailing dental health practice of the parents for their children, almost 65% of the children in this study did not have dental caries, which is similar to the survey done by Shamata Sufia et al,[16] where 60% of the children had caries free mouth though a number of maternal factors such as level of education, families income effect the dentally related behaviour of the mother.

The link between socioeconomic status and health, including oral health, is well established. It has been already demonstrated in numerous studies that the health of individuals from the lower end of the socioeconomic scale is significantly worse than that of individuals from the upper end of the socioeconomic scale[17]. Oral health services utilization is a multifactorial phenomenon, and this utilization depends on various factors like dental conditions, socioeconomic conditions, attitude and financial conditions. Social factors are important, as shown in various models. Still, here more emphasis was given to subjective reasons which act as barriers in regular dental care, because the individual himself is mainly responsible for his/her regular dental care, and dental attendance[18].

Income is dependent on the employment status of the family members. This in turn dictates the health-related practices as well as the priorities on dental health matters.

The present study did not consider the employment status of the family, but considered the income level of the family to determine the socioeconomic standing of the family. Parental income affects the caries prevalence in children in the present study. Children belonging to low middle followed by lower class had high caries experience than other income groups. This finding is similar to the study conducted by Joyson et al., (2011)[19], Nuhu Amin et al., (2005)[20], unlike Shamata Sufia et al.,[16] Rahul Naidu et al.,[21] where more number of children from below the poverty line were observed with a less caries experience. A statistically significant correlation was found between caries prevalence and low socioeconomic status, measured in terms of income. In the low socioeconomic status groups, the prevalence of dental caries was high considering their poor oral hygiene practice, lack of awareness, improper food intake, and family status.

Most of the lower-class parents in the present study stated that milk teeth don't need any treatment,

followed by lower middle-class parents. The possible reason for this finding could be pertaining to the fact that the individuals from the lower socioeconomic status experience disadvantages financially, socially, and materially which may compromise their ability to care for themselves, and makes it difficult to afford professional health care services, and to live a healthy life in a healthy environment.

In the present study, parents from the upper class preferred to initiate tooth brushing six months after the tooth started erupting, which was not significant to that of carious experience of the child. This is in accordance to the study done by C.H Law et al.,[22] where there was a reverse association between initiation and frequency of tooth brushing to that of the proportion of caries-free mouth.

The socioeconomic status of the parents was significantly associated in both the scenarios i.e., in treating an asymptomatic tooth and a symptomatic carious tooth. Parents from the upper-middle class showed interest in asking for other alternative treatment when advised for extraction, while other income group parents agreed to extract the teeth. The reason may be because the low socioeconomic status individuals have more fatalistic beliefs about their health, and they have a lower perceived need for care, thus leading to less self-care and lower utilization of preventive health services.

Parents from all the five income groups preferred to start supervised brushing for asymptomatic carious teeth, similar to the study done in Davangere by Tyagi R6 where 71% of the mothers started supervised brushing when they noticed decay in their children. Previous Studies in the literature have shown that the preschool child lacks the understanding and also the manual dexterity to maintain a good oral hygiene. So, parents must think that if they start supervised brushing black spot noticed on the tooth might disappear. In the present study, knowledge on dental caries was better among high-income group parents. This may be associated with the level of education of the parents. Parents with higher education have a better knowledge regarding the oral hygiene practice and the importance of deciduous teeth. This is similar to a study by Suresh BS23, which reports that mothers who have had a lower level of education also tend to have low levels of knowledge regarding oral health. Hence, it has been suggested that the parents who have had a good or higher level of education may be able to assess the appropriate sources of information in a better form and understand it thoroughly.

The findings of the present study illustrated that parents' dental-related behaviour, along with socioeconomic background, are essential in their children's dental health. Parents in the present study have relatively better perceptions regarding primary teeth, and their attitude towards treating asymptomatic teeth was affected by the socioeconomic status of the family.

The limitation of the present study is that, as it was a questionnaire-based study there was an inability to probe responses and there may be a memory-based distortion in the participant's responses. Further, there is no way to tell how much thought a respondent has put in.

V. Conclusion

This study highlights the importance of prevention to combat dental caries. Prevention programs should target specific groups; however, the best method depends on several factors, including cultural, economic, and geographic factors. The most suitable strategy depends on local factors. The early identification of high-risk groups and the approaching of behavioral aspects in preventive and educational programs on oral health should be encouraged.

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Impact of Perceived Chronic Social Adversity on the Oral Health Status among Eunuchs in Vishakhapatnam: A Cross Sectional Study

By R Bhaskara Rao

Abstract- *Background:* Transgenderism in India is a widely known culture yet mainstream population has no proper awareness about the community. They are maltreated and oppressed socially and mostly, they are disowned by their own family due to the fact of being a transgender. Social adversity, an umbrella term refers to issues such as violent crime, segregation, exposure to delinquent peers, poverty, and poor parenting, is one of the strongest risk factors for developing an antisocial behavior.

Aim: Aim was to assess the impact of Perceived Chronic Social Adversity on the Oral Health status among Eunuchs.

Keywords: *eunuchs, social adversity, oral health status, cross cultural adaptation.*

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R Bhaskara Rao

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Aim: Aim was to assess the impact of Perceived Chronic Social Adversity on the Oral Health status among Eunuchs.

Materials and Methods: This cross-sectional study included 60 study participants. Perceived Chronic Social Adversity (PCSA) scale was used to assess the level of chronic social adversity. Clinical examination was done using WHO oral health assessment form 2013. Data was analyzed using SPSS version 20, ($P \leq 0.05$*) was considered as statistically significant. Chi square test was used.

Results: A total of sixty Eunuchs had taken part in answering the questionnaire and completing the examination. Mean age is 35.5 years. The impact of chronic social adversity on the oral health status comprised a total of 20 questions altogether. The highest correct response rate recorded of all questions was 39% where 23 participants agreed that they always feel abandoned ($P \leq 0.005$*). In the age group 27-36 years showed the highest prevalence of poor oral health status.

Conclusion: In summary, we observed that there is indeed an impact of social adversity on the oral health status on eunuchs. This present study showed the view of oral health as an outcome which shares an array of psychosocial, biological and social factors interplay.

Keywords: eunuchs, social adversity, oral health status, cross cultural adaptation.

I. Aim

To assess the impact of Perceived Chronic Social Adversity and Oral Health among Eunuchs.

II. Objectives

- To assess the level of Perceived social Adversity using Perceived Chronic Social Adversity (PCSA) scale.
- To assess the Oral Health Status using WHO oral health assessment form 2013.

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III. Introduction

The word 'EUNUCH' is derived from a Greek word meaning 'keeper of the bed'. They are considered as one of the most vulnerable sections in the Indian Population who go by the name of "Hijras" meaning Eunuchs. There are so many social stigmas associated with this community that these people do not come out in open and even if they come out in open, they often resort to various debilitating lifestyle habits that affect their general well-being and oral health in a negative sense. They are also called as transgenders, transsexuals, and transvestites in English and colloquially hijras, alis, kothis, double deckers, and panthis in India which is a widely known culture yet mainstream population that has no proper awareness about this community.[1] Most of the time, they are maltreated and oppressed socially and disowned by their own family due to the fact of being a transgender. In Indian context, Hijras are seen as a "third gender" which is neither male nor female but contains elements of both.[2] In addition, India has no proper data on their socio-economic status. Since the beginning of time and the existence of mankind, transgender have been very much a part of the society. It is just that they have been given a name and a status in the society in recent times. They are denied general, oral health and psychological assistance and the accessibility to medical and dental facilities for the eunuchs is nearly nonexistent.[3] The prevalence of dental caries and periodontal diseases are considerably higher in the developing countries like India which is one of the major emerging market economies with a population of over 1 billion and is very diverse in geography, culture, tradition, habits and even race. This diversity also extends to literacy rates, health indicator rates Infant Mortality Rate (IMR) and hygiene practices.[4] They constitute the marginalized section of the society in India and thus face legal, social as well as economic difficulties as they are "tolerated but not accepted". Due to these reasons, they might be at a high risk of developing severe dental problems like tooth loss.[5]

Indian Census has never recognized third gender i.e. Transgender while collecting census data for years. But in 2011, data of Transgender were collected with details related to their employment, Literacy and

Caste. In India, total population of transgender is around 4.88 Lakh as per 2011 census. The 2011 census also reported 55,000 children as transgender identified by their parents.[6]

In India, total transgender population stands with 4, 87,053 with highest cases in Uttar Pradesh stands with 1, 37,465 and least in Kerala; 3,902. Children transgender population stands with 58,854.

Though they constitute a little percentage of the total population, it is essential to extend our knowledge and facilities in order to improve the oral health status of this population.[7]

A Report on Fifth Annual Employment - Unemployment Survey 2015-16 shows the involvement of transgender in different categories of employment. Transgender are leading in a Self-employed category that is 44.9% in the UPS (Usual Principal Status) as well as UPSS (Usual Principal and Subsidiary Status) approach followed by casual labor 31.5%, wage/salary earners 19.6% and contract workers 4.9% in the UPS and 4.7% in the UPSS approach.[8]

Social adversity, an umbrella term that refers to issues such as violent crime, segregation, exposure to delinquent peers, poverty, and poor parenting, is one of the strongest risk factors for developing antisocial behavior.[9] early and continued exposure to social adversity has detrimental effects for developing youth, and can exacerbate preexisting behavioral issues.[10]

Research shows that the progression of antisocial behavior and subsequent delinquency is shaped by antisocial attitudes, poor schooling and a lack of collective efficacy in the community, delinquent peer affiliations during adolescence, and malnutrition.[11] Behavioral genetic studies have also demonstrated that shared and non-shared environmental influences play significant roles in predisposing individuals to antisocial behavior. In addition, the social environment influences biological risk factors that have been linked to antisocial and criminal behavior. There is no data regarding the impact of this on the oral health.

Therefore this study was done to assess the impact of perceived social adversity on the oral health status of eunuchs.

IV. Ethical Consideration

This study was approved by Anil Neerukonda Institute of Dental Science Visakhapatnam, AP Institutional Ethical Committee [Ref No. ANIDS\IEC\2121014]. Throughout the study, confidentiality of data was preserved.

V. Materials and Methods

a) Study Setting

This cross-sectional study was conducted to investigate the Impact of Perceived Chronic Social Adversity on the Oral Health Status among Eunuchs in Vishakhapatnam city, Andhra Pradesh.

b) Informed consent

The study protocol was explained and written informed consent which explained the study objectives was obtained from each study participant.

c) Source of data

The data is primary in nature and study subjects comprises of self-identified eunuchs residing in the Vishakhapatnam city.

d) Sampling design and sample selection

The study took place in Vishakhapatnam and all the self-identified eunuchs residing in the city of Vishakhapatnam who fulfilled the inclusion criteria were enrolled in this study. Information about the residence of the eunuchs is being based on interviews with local informants and prominent localities in Vishakhapatnam are identified. All the identified areas were visited and eunuchs residing in these areas were contacted.

The lists of identified areas are:

- *Kancherapalem*
- *Seethamadhara*
- *Railway New Colony*
- *Burma camp*

As the study participants are a hard to reach population, Snow ball or chain referral sampling technique was applied; i.e. Study subjects in their respective residing areas are contacted and existing study participants recruited future subjects from among their acquaintances were contacted. Finally a total of 60 eunuchs were identified.

e) Inclusion criteria

- Participants who were willing to participate and who gave informed consent were included in this study.
- Participants belonging to age groups between 17-60 years.

f) Exclusion criteria

- Participants who are not willing to participate were excluded.
- Participants who did not give informed consent were excluded.
- Participants who have systemic diseases.

g) Structure of the questionnaire

To assess the social adversity; perceived chronic social adversity (PCSA-28) scale was used. The scale consists of a pretested, validated questionnaire containing 28 close ended questions with a five point Likert scale; with options ranging from strongly agree to strongly disagree. The questionnaire is modified with final of 20 close ended questions. Prior permission was obtained by the main researcher of the article and the approval was granted. The questionnaire initially in

English was translated into Telugu language and the re-translated back to English to check for cross cultural adaptation that encloses both the language and cultural adaptation into the study participants. The interview was conducted in regional language (Telugu).

h) Data collection

The data which is primary in nature was obtained using WHO oral health assessment form 2013. Clinical examination (ADA Type 3) was conducted by a single examiner under natural light, by using mouth mirror, CPI probe with the study population seated on upright chair.

i) Statistical analysis

All the obtained data was entered into Microsoft excel sheet and analyzed using Statistical Package for Social Science (SPSS, IBM, USA) version 21. The statistically significant level was set at less than 0.05 with confidence interval of 95% and chi square test was used.

VI. Results

Data of the study population showed a total of sixty Eunuchs had taken part in answering the questionnaire and completing the examination. Mean age is 35.5 years. Table 1 shows the impact of chronic social adversity on the trauma comprising a total of 20 questions altogether. The highest correct response rate recorded of all questions was 39% where 23 participants agreed that they always feel abandoned. 42.4% respondents answered that they are subjected to physical violence.

Table 2 showed the prevalence of oral health status of the study participants with respect to their age group. Dental caries, gingival bleeding, pockets, loss of attachment, trauma, oral mucosal lesions and interventional urgency showed the highest in the age group of 27-36 years with a prevalence of 51.7%, 61.7%,61.7%,51.6%, 51.6%,78.3% and 45% respectively and least is seen in the age group of 58-70years.

Table 3 showed the impact of perceived chronic social adversity scale on the oral health status. The questions were grouped into three domains i.e., obvious social exclusion domain which showed a significant association, over control social exclusion domain and weakness in social competition domain in which showed statistical significance.

Table 1: Impact of Perceived Chronic Social Adversity

S. NO.	QUESTION	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
1	(0.005*)Do You Always Feel Abandoned?	43 (71.6%)	17(28.3%)	0	0	0
2	Are You Always Being Ill-Treated?	54 (89.4%)	4 (10.6%)	0	0	0
3	Do You Always Feel Ignored?	49 (81.6%)	21(35.1%)	0	0	0
4	Do You Always Feel Deceived?	23 (38.3%)	47(78.3%)	0	0	0
5	Do You Always Feel Isolated?	16 (26.6%)	44 (73.3%)	0	0	0
6	Do You Always Feel Rejected?	51 (84.9%)	2 (15.1%)	0	0	0
7	(0.005*)Do You Always Feel Humiliated?	59 (98.4%)	1 (1.6%)	0	0	0
8	Do You Always Feel Derogated?	18 (30.2%)	42 (69.8%)	0	0	0
9	Do You Always Feel Slandered?	20 (33.3%)	40 (66.6%)	0	0	0
10	Do You Always Feel Doubted?	20 (33.3%)	3 (66.6%)	0	0	0
11	Do You Always Feel Your Feelings Are Being Changed By Someone?	1 (1.6%)	59 (98.3%)	0	0	0
12	Do You Feel Your Freedom To Speak Is Restricted?	0	3 (5.0%)	7 (11.6%)	40 (66.6%)	10 (16.6%)
13	Are Your Decisions Being Made By Someone Else?	7 (11.6%)	53 (88.3%)	0	0	0
14	Do You Feel Someone Your Actions Are Being Changed By Someone Else All The Time?	0	0	11(18.3%)	19 (31.6%)	30 (50%)
15	Do You Always Be Blamed For Other's Actions?	0	0	4 (6.6%)	33 (55%)	23 (38.3%)
16	Is Your Past Being Bought Up Every Time When You Argue With Someone?	4 (6.6%)	55 (91.1%)	0	0	0
17	(0.005*)Are You Being Subjected To Any Physical Abuse?	60 (100%)	0	0	0	0

18	Do You Always Feel Threatened?	3 (5.0%)	5 (8.3%)	2 (3.3%)	47 (78.3%)	3 (5.1%)
19	Is There Someone Who Always Cares About You?	3 (5.0%)	2 (3.3%)	13 (21.6%)	32 (53.3%)	0
20	Do You Always Fail In Applying A Job?	39 (65.0%)	8 (13.3%)	3 (5.0%)	0	0

P≤0.005 statistically significant, P≤0.001** highly statistically significant*

Table 2: Prevalence of oral health status according to age group

Age (In years)	Dental caries(0.136)	Gingival bleeding (0.806)	Pockets (0.379)	Loss of attachment (0.543)	Trauma (0.844)	0ral mucosal lesions(0.274)	Interventional urgency (0.155)
16-26	12 (18.3%)	5 (8.3%)	5 (8.3%)	5 (8.3%)	5 (8.3%)	2 (3.3%)	15 (25.0%)
27-36	30 (51.7%)	37 (61.7%)	37 (61.7%)	37 (51.7%)	31 (51.6%)	47 (78.3%)	27 (45.0%)
37-47	10 (16.7%)	10 (16.7%)	10 (16.7%)	10 (16.7%)	16 (26.6%)	7 (11.6%)	10 (16.7%)
48-56	4 (6.7%)	4 (6.7%)	4 (6.7%)	4 (6.7%)	8 (13.3%)	5 (8.3%)	4 (6.7%)
58-70	4 (6.7%)	4 (6.7%)	4 (6.7%)	4 (6.7%)	0 (0%)	4 (6.7%)	4 (6.7%)

P≤0.005 statistically significant, P≤0.001** highly statistically significant*

Table 3: Impact of the PSA scale on oral health status

Domains	Oral health status	P-value
Obvious Social Exclusion	Dental caries	0.004*
	Gingival bleeding	
	Pockets	
	Loss of attachment	
	Trauma	
	0ral mucosal lesions	
Over control Social Exclusion	Dental caries	0.114
	Gingival bleeding	
	Pockets	
	Loss of attachment	
	Trauma	
	0ral mucosal lesions	
Weakness in Social Competition	Dental caries	0.001*
	Gingival bleeding	
	Pockets	
	Loss of attachment	
	Trauma	
	0ral mucosal lesions	

P≤0.005 statistically significant, P≤0.001** highly statistically significant*

VII. Discussion

A number of studies have examined the oral health, but there is no reference to the connection between the social adversity and its oral health. This study was conducted among eunuchs to assess the impact of chronic social adversity on their oral health status. A pretested, validated questionnaire was used to assess the exposure to three types of stressful/negative events: obvious or obscure social exclusion, over control, and weakness in social competition[12]. A total of 60 participants enrolled in this study. 40% of study participants strongly agreed that they felt abandoned which showed an impact on the trauma. Majority of the participants strongly agreed to physical abuse which showed an urgent need for interventional urgency as eunuchs who most of them working as sex workers are subjected to abuse. All the study participants showed dental caries, periodontal pockets and loss of attachment which indicates the poor oral health status requiring interventional urgency. 39% of the study participants who strongly agreed to having episodes of humiliation, slandering and who felt abandoned showed a positive impact on the oral mucosal lesions as the issues such as violent crime, segregation, exposure to delinquent peers, poverty become embedded into their minds which pave way for these habits to happen. Participants are aware of their oral health, there are multiple socioeconomic disadvantages that members of particular group experience which limits their access to

health particularly oral health. Also the age group 27-36 years showed the highest prevalence of oral conditions which may be due to the fact that they were subjected to humiliation and as a outcast. Eunuchs are one of these neglected special vulnerable groups in India projected as an outcast, where special attention is required to improve the overall oral health. This study showed a marked rise in consumption of tobacco among eunuchs with a frequency of consuming these products many times a day. This higher usage of tobacco can be due to psychosocial stress in their unfavorable social position, the lack of awareness on the ill effects of these habits. Table 3 showed the association between the PCSA scale and oral health status, the questions were grouped into three domains. The obvious social exclusion domain comprised of questions in which they were asked if they were subjected to humiliation, derogation, etc and over control social exclusion domain deals with one's impact on their mental health and the last domain weakness in social competition deals in challenges they face in social participation like as in securing a job. Hence, there shows an immediate need of developing strategies which are more promotive and preventive which will direct eunuchs in improving their oral health. This in turn drives this socially stigmatized community to have a positive dental health.

Limitation

Small sample size limits true representation of the study.

VIII. Conclusion

In summary, we observed that there is indeed an impact of perceived social adversity on the oral health status on eunuchs. This present study showed the view of oral health as an outcome which shares an array of psychosocial, biological and social factors interplay. Efforts are to be done that increases patient awareness of the oral effects of tobacco use and to eliminate the habit are needed to improve the oral and general health of eunuchs. This allows in reduction in oral disease risk prediction with an ultimate goal of improving the oral health.

Public Health Significance

Oral health education should be given to their community explaining about the ill effects of pernicious habits like smoking, tobacco usage and development of specific dental care programs involving both health education and preventive and curative dental care and implementing behavioral interventional programs that aim at providing alternative jobs. This should be done in collaboration with government and non-government organizations and further studies are to be conducted to explore the relationship between perceived chronic social adversity and oral health.

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Comparison between Panoramic Radiograph and Lateral Cephalogram in Determining Gonial Angle in Western UP Orthodontic Patients

By Rashi Chaturvedi

Abstract- *Introduction:* Gonial angle is an important determinant of mandibular morphology and a salient parameter in the evaluation of vertical growth dysplasia as well as facial skeletal asymmetry. It also has got important application in age estimation in forensic sciences, formulating camouflage and ortho surgical treatment plan for skeletal malocclusion, as well.

Aim: The study aims to check whether there is any significant difference between the assessment of gonial angle from panoramic radiograph and lateral cephalogram in western UP orthodontic patients and establishing the reliability of panoramic radiograph as an essential diagnostic aid in orthodontics.

Keywords: *gonial angle, OPG, lateral cephalogram, growth pattern.*

GJMR-J Classification: *DDC Code: 617 LCC Code: RK1*

Strictly as per the compliance and regulations of:

Comparison between Panoramic Radiograph and Lateral Cephalogram in Determining Gonial Angle in Western UP Orthodontic Patients

Rashi Chaturvedi

Abstract- ***Introduction:*** Gonial angle is an important determinant of mandibular morphology and a salient parameter in the evaluation of vertical growth dysplasia as well as facial skeletal asymmetry. It also has got important application in age estimation in forensic sciences, formulating camouflage and ortho surgical treatment plan for skeletal malocclusion, as well.

Aim: The study aims to check whether there is any significant difference between the assessment of gonial angle from panoramic radiograph and lateral cephalogram in western UP orthodontic patients and establishing the reliability of panoramic radiograph as an essential diagnostic aid in orthodontics.

Materials and Methods: A total of 60 panoramic and cephalometric radiographs of patients (24 males, 36 females) ranging from age 12-24 years were used in this study. The gonial angle was determined by tracing a tangent to the lower border of the mandible and another tangent to the posterior ramus of the mandible both on panoramic radiograph and lateral cephalogram manually and measured with the help of protractor. Pearson correlation was applied to check for correlation between cephalometric and panoramic gonial angle value.

Results: High correlation between cephalometric and panoramic gonial angle values was seen using pearson correlation coefficient.

Conclusion: Panoramic radiograph can be used as an effective, reliable, alternative to lateral cephalogram in determining gonial angle which shows versatility of panoramic radiograph as a diagnostic tool.

Keywords: gonial angle, OPG, lateral cephalogram, growth pattern.

I. Introduction

In orthodontics, the treatment planning is based of enumeration of problem list, clinical examination and evaluation of diagnostic records i.e. dental casts, radiographs and photographs.[1]

Orthopantomogram is considered as an essential diagnostic aid for gross assessment of dental and skeletal framework.

In 1961 Prof. Yrjo Paatero introduced panoramic radiography.[2] It provides a bird's eye view of the entire dentition, information about teeth and their axial inclinations, stages of maturation, surrounding structures and supporting bone.[3-6] In 1934 Hofrath and Broadbent introduced cephalometrics as a research and a clinical tool.[1]

Gonial angle on lateral cephalogram is measured by the intersection of tangent to the lower border of the mandible and posterior ramus.[7,8] In hyperdivergent or high angle cases the gonial angle is found obtuse, which interprets downward and backward rotation of the mandible. In hypodivergent or low angle individuals gonial angle values are acute, and interprets upward and forward rotation of the mandible. Recent studies have shown that OPG can also be used to determine gonial angle which is an important parameter in cephalometric diagnosis. Larheim & Svanaes[9] observed inaccuracy and difficulty in measuring gonial angle using lateral cephalogram because of the superimposition of right and left images. Also the gonial angle values measured from OPG was same as measured from dried human mandibles. Mattila et. al (1977) also concluded that gonial angle measurement from OPG were the same as from lateral cephalogram.[8]

Several investigators determined gonial angle using OPG and lateral cephalogram and found OPG as a reliable and accurate tool in determining the gonial angle.[8,9,10] On the other hand, other studies proposed that the interpretation of the vertical aspect of craniofacial structures can be reliably obtained via OPG but other diagnostic informations are more reliably achieved via lateral cephalogram.[6,11] The aim of the study was to check whether there is any significant difference between the assessment of gonial angle from OPG and cephalogram in western UP orthodontic patients. Application of orthopantomogram also gives an important information regarding vertical jaw dysplasia in routine orthodontic practice.

II. Materials and Methods

A total of 60 panoramic and cephalometric radiographs of patients (24 males and 36 females, age 12-24 years) who were enrolled for treatment at Department of Orthodontics and Dentofacial Orthopedics, Kalka Dental College, Meerut were used in this study.

The inclusion criteria for the radiographs were as follows: The radiograph had to be of high quality and sharpness; all radiographs had to be taken using the same apparatus.

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The exclusion criteria for the radiographs were: dento-facial trauma, history of any facial/mandibular surgery, syndromes in relation to face/jaw and asymmetric facial appearance.

Lines tangent to the lower border of mandible and distal border of ascending ramus and condyle on both sides were drawn to mark gonial angle in OPG. (Fig. 1).

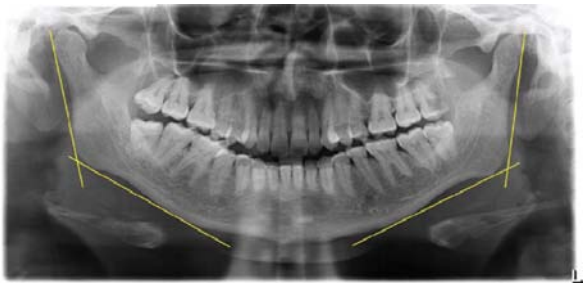


Fig.1: Construction of gonial angle on a panoramic

The point of convergence of plane tangential to lower border of mandible and that tangential to distal border of ascending ramus and condyle were drawn to mark gonial angle in lateral cephalogram (Fig. 2).

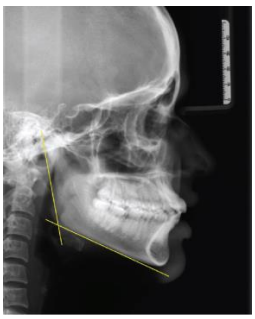
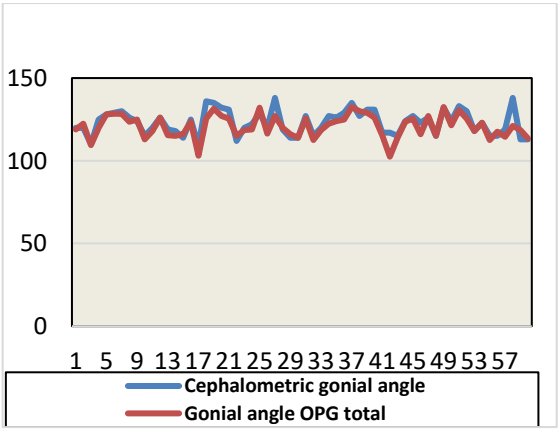


Fig. 2: Construction of gonial angle on a lateral cephalogram

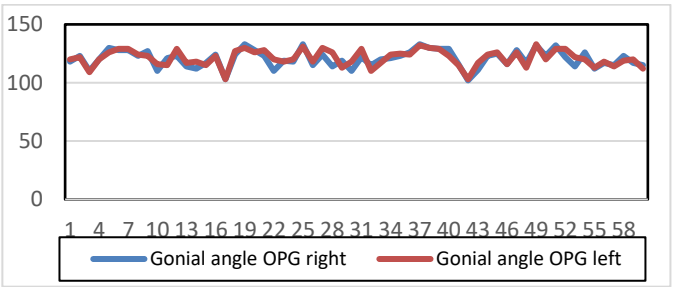
Statistical Analysis: As the data for angles were quantitative data, these were estimated using mean and standard deviation. Correlation between the radiograph techniques was made by applying pearson correlation. The level of significance $\alpha = 0.05$ was set for the two-sided statistical tests.

III. Results

The study sample consisted of panoramic radiographs and lateral cephalograms of 60 patients (36 females and 24 males; age range 12-24 yrs. The subjects were divided based on gender into males and females and compared for the value of gonial angle on OPG or cephalogram.



Graph 1: Line graph depicting cephalometric gonial angle and gonial angle OPG total values for 60 patients



Graph 2: Line graph depicting gonial angle OPG right and gonial angle OPG left values for 60 patients

Table 1 Shows that there was no statistically significant difference between the gonial angle values taken on lateral cephalograms and OPG.

Table 1: Mean, Standard deviation and Standard error of panoramic and lateral cephalometric gonial angle values in subjects distributed on the bases of gender

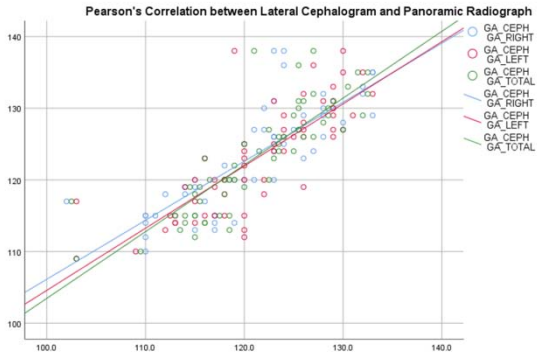
Table 1. Mean , Standard deviation and Standard error of panoramic and lateral cephalometric gonial angle values in subjects distributed on the bases of gender				
Gender	**N**	**Mean(degrees)**	**Std.deviation**	**Std. error mean**
Cephalometric gonial angle				
Male	24	122.5	7.47	1.529
Female	36	123.5	7.44	1.241
Gonial angle OPG right				
Male	24	121.23	6.94	1.419
Female	36	120.13	7.65	1.275
Gonial angle OPG left				
Male	24	120.75	6.12	1.25
Female	36	121.58	7.46	1.244
Gonial angle OPG total				
Male	24	120.66	6.51	1.33
Female	36	120.86	7.29	1.216

Correlation between values of cephalometric and OPG gonial angle was checked by applying pearson correlation coefficient. The level of significance was set at $p \leq 0.05$.

Table 2: Pearson's correlation of cephalometric gonial angle, gonial angle OPG right, gonial angle OPG left, and gonial angle OPG total

Table 2. Pearson's correlation of cephalometric gonial angle,gonial angle OPG right, gonial angle OPG left, and gonial angle OPG total				
	Ceph. gonial angle	**OPG rt**	**OPG lt**	**OPG total**
Ceph. gonial angle Pearson correlation Sig. (2-tailed)	1	0.82	0.80	0.85
N	60	60	60	60
OPG right Pearson correlation Sig. (2-tailed)	0.82	1	0.83	0.96
N	60	60	60	60
OPG left Pearson correlation Sig. (2-tailed)	0.80	0.83	1	0.95
N	60	60	60	60
OPG total Pearson correlation Sig. (2-tailed)	0.85	0.96	0.95	1
N	60	60	60	60

Table 2. shows a high correlation between the values taken on both the radiographs.



Graph 3: Pearson's correlation between lateral cephalogram and panoramic radiograph

IV. Discussion

The goal of this study was to diversify the clinical application of panoramic radiographs by exploring its ability to evaluate craniofacial structures. Even though there are a number of published articles on disadvantages of using panoramic radiographs because of its image distortion and magnification, there are only a few studies involving the use of panoramic radiographs in evaluating dentoskeletal structures and gonial angle measurements.

The results of the above study showed that there are no statistically significant differences in the values of gonial angle measured on cephalogram and panoramic radiograph. Therefore, it is possible to use panoramic radiograph for measuring the gonial angle with equal accuracy as cephalogram. Right and left gonial angles can be clearly and separately viewed using orthopantomogram. Mattila et al.(1977)[8] showed that measurements on OPG for right and left gonial angles conform to the angles measured on dry skulls and the measurements made on OPG are more accurate than measurements made on cephalogram. The present study shows the same results. But, still, lateral cephalogram is considered routinely for measuring the gonial angle rather than OPG. The results of the present study demonstrate that panoramic radiographs can be used to make these measurements as often as lateral cephalograms, especially in cases of asymmetries before taking PA cephalogram and where the right and left sides are not clearly visible.

Anderson and Popovich (1989)[12] analysed samples of 227 children from Burlington growth centre records. They made cephalometric measurements of anterior cranial base, posterior medial and lateral cranial base length, mandibular ramus height, mandibular body length and angles of Class I and II groups. They found a strong correlation between lateral and medial cranial base angles in Class II malocclusion groups as compared to Class I group malocclusions.

Gungor, Sagir and Ozer (2007)[13] compared gonial angle symmetry and sexual dimorphism in ancient Anatolian population. They concluded that there is no asymmetrical difference between right and left gonial angle degree of individuals belonging to the same sex.

Oksayan et.al (2012)[14] assessed gonial angle by comparing panoramic and lateral cephalogram radiograph on 49 patients with an age range of 12-29 years. They studied subjects retrospectively under groups i.e. skeletal and dental Class I, II and II malocclusion group. The results showed no significant differences between group values of gonial angles determined by lateral cephalometric radiograph and panoramic radiograph.

Adil et.al (2015)[15] conducted a hospital based survey on 80 departmental Class I malocclusion patients. They checked the accuracy of measurement of gonial angle values traced through OPG and Lateral cephalogram. They concluded that the gonial angle of both right and left side OPG is reliable but a significant difference was observed when measured from lateral cephalogram.

Katti et.al (2016)[16] studied 100 OPG and lateral cephalogram radiographs of patients with Angle's Class I malocclusion with age ranging from 15 to 30 years. They concluded that there was no statistical difference between the measured gonial angles on panoramic and cephalometric radiographs.

Radhakrishnan, Varma and Ajith (2017)[17] evaluated the accuracy of measurement of gonial angle of Class I malocclusion patients using both lateral cephalogram and panoramic radiograph. They found no statistical significant difference between gonial angle measurements using OPG or lateral cephalometric radiographs.

Bibi, Rasool and Khan (2017)[18] studied 100 radiographs of patients with the mean age of 18 years. Their result showed a significant correlation between OPG and lateral cephalometric values. They also concluded that OPG is a reliable and versatile tool as lateral cephalogram for assessing vertical facial pattern.

Ul-Haq, Memon and Agha (2018)[19] compared three methods to determine gonial angle on cephalogram and orthopantomogram among three groups i.e. hypodivergent, normodivergent and hyperdivergent of 178 radiographs. They concluded that OPG cannot be an alternative choice for gonial angle

determination and lateral cephalogram cannot be replaced by OPG.

Lone and Mushtaq (2018)[20] carried out a cross sectional study on 90 subjects divided into three groups i.e Class I, Class II, Class III. They concluded that measurement of gonial angle in OPG was as reliable as found in lateral cephalogram. In our study, gonial angle on lateral cephalogram and OPG was assessed which revealed striking correlation between the measurements on both radiographs. Pearson correlation coefficient of 0.820 and 0.803 was found for right and left gonial angles with lateral cephalogram respectively. There was no statistically significant difference between the values of the total gonial angle wrt OPG and lateral cephalogram.

Our study clearly showed the reliability and versatility of panoramic radiographs other than its routine dental use. Also the results are comparable to the findings of other researchers which strengthens our conclusion. No studies are available on western UP orthodontic population regarding the reliable applicability of OPG for vertical growth pattern. Our study fills a knowledge gap in this regards. OPG is an important diagnostic tool and this study confirms its reliability as an alternative diagnostic tool to lateral cephalogram for determining gonial angle however, it cannot substitute lateral cephalogram in the information contained in it.

V. Conclusion

Gonial angle can be measured accurately by using panoramic radiography or lateral cephalogram. Furthermore, in panoramic radiography, the right and left gonial angles can be measured easily without superimposition of anatomic landmarks, which occurs frequently in lateral cephalogram. For determination of the gonial angle, an OPG may be a better choice than a lateral cephalogram as it is an essential diagnostic tool, also radiation dose is low as compared to lateral cephalogram, and is cost effective. As a result, the aim of this study was to improve the clinical flexibility of the panoramic radiography, which is a critical tool for dental diagnosis.

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5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

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Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

INDEX

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