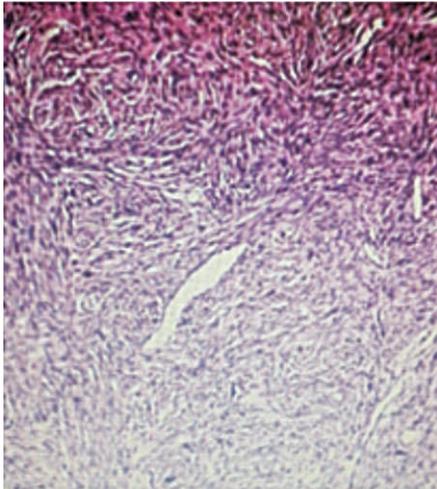


SRI RAMACHANDRA JOURNAL OF MEDICINE

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JAN - JUNE 2014

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From the Editor's Desk

Dear Readers,

We are happy to bring out the Jan - June 2014 issue. It has three Original Articles, two case reports and Interesting Image in Medicine. I am sure these would enrich your knowledge base further.

I would like to place on record the efforts of the Editorial Board Members, Peer Reviewers and the contributors in bringing out this issue.

We are working hard to bring out the July - Dec 2014 issue in the next 2 months.

P.V. VIJAYARAGHAVAN

EDITOR

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EDITORIAL BOARD AND REVIEWER'S EYE ON SUBMITTED MANUSCRIPT

Dr.Pankaj B. Shah*,

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Once an article is submitted to a journal, first members of editorial board have a look to that article to assess the suitability of article for the journal. Once one or two members of the editorial board are convinced about the suitability of your article in the journal, then only it is send to reviewers for their comments and suggestions.

The question is what members of the editorial board look for? The editorial board members will look for:

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2. English or language standard of the manuscript
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8. Authors responses to reviewer's comments and changes in the article.

Hence first and forth most important issue for an author is to suitably select journal for submission. Majority of the times, article rejection is due to inappropriate journal selection. Authors should read scope of the journal to assess the suitability of the manuscript for the journal. If we say a step further, author should keep in mind the important good quality journals while planning a research for original study or while starting a review article. The second common reason for non-acceptance of an article is improper referencing. The authors should read the instruction to authors section properly while writing references. Any errors however small may be like comma or full stop etc will never be corrected by Editorial board members and will be returned to authors without looking at the article for necessary correction and resubmission.

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1. The whole article including abstract is as per required word count.
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9. Authors responses to reviewer's comments and changes in the article if already reviewed.

Usually two reviewers will be selected who will assess your article blindly (without knowing authors details) as per the format prescribed by the journal. Quality of the review is very important for any good journal to keep its standard, hence their selection will be done after due care. Also reviewers do not want to affect their standing in the scientific community. Only few journals may have unblinded review mechanism.

Thus the readers can understand that Editors and reviewers assess the different things in the manuscript. Largely editorial board assess the suitability of the article under scope of the journal while reviewers assess the scientific validity of the article. Hence our manuscript should be written in such a way that it fulfils both editorial board and reviewer's expectation to be selected for publication.

COMPARISON OF DIFFERENTIATION TO MACROPHAGES IN ISOLATED MONOCYTES FROM HUMAN PERIPHERAL BLOOD AND THP1 CELLS

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ABSTRACT

Background & Objectives:

Monocytes developed from bone marrow enter circulation and constitute approximately 10% of peripheral blood leucocytes in humans. Under appropriate stimulatory conditions the blood monocytes are differentiated into macrophages. The human monocyte cell line (THP 1) cells are premonocytes committed to the monocytic cell lineage and are frequently used as a model system for monocytes. These cells were cultured in the presence of human serum for the induction of terminal differentiation to macrophage like cells.

Macrophages are chief source of cytokines and co stimulatory molecules that play a major role in the systematic activation of T and B cells. They are involved in many inflammatory disease conditions such as rheumatoid arthritis. In the present study, a cell culture method to ascertain the stages during macrophage differentiation was examined.

The main objective of the study was to isolate and compare the differentiation of monocytes to macrophages at different time points in growth media from

- (i) Human peripheral blood.
- (ii) THP1 cells (in vitro)

Methods:

Five ml of peripheral blood was collected in EDTA vacutainers from healthy volunteers, ranging in age from 18 to 50 years. Monocytes prepared from samples of peripheral blood and THP1 cell lines were grown with RPMI 1640, 10% FCS and human serum in vitro. Conditions needed to optimize differentiation to macrophages were determined using viability and morphology as indicators. Cell viability was assessed by haemocytometer using 0.2% Trypan blue. Morphological differences were measured by inverted

phase contrast microscope. The statistical analysis was performed using MS Excel software. The cell size measurements were made by using image pro3 software.

Results and Discussions:

The peripheral blood mononuclear cells (PBMC) and THP1 monocytic cells were induced with human serum and morphological differences were observed in both. The population of THP 1 monocytic cell differentiation was more than the PBMC on third day post induction. Morphological differentiation of PBMC and THP1 cells post induction continued to be seen upto 7 days of culture indicating their ability to be functional macrophages. Of the two cells cultured PBMC cells showed greater increase in size from 6 μm to 31 μm on day 7 post induction than the THP 1 cells from 16 μm to 23 μm at day 7. The results of this study are useful for optimizing the time points suitable for screening molecules in signal transduction pathway during inflammation.

Conclusion: This study has revealed that the 3rd day post induction with the use of AB human serum was ideal for differentiation of cells. This model could be used to study the signal transduction pathway in rheumatoid arthritis.

Keywords: THP-1 Monocytes, Macrophages, Cell differentiation.

SRJM 2014;7:2-8

INTRODUCTION

Macrophages are obtained from CD34 positive bone marrow progenitors that persistently proliferate and disgorge their progeny as promonocytes in the blood stream.^[1] In the tissues they differentiate to macrophages.^[2] Upon differentiation, the cell loses its capacity to replicate and increases its antibacterial properties. This enables it to be involved in the inflammatory and immune responses. The differentiation process is an intricate one and is regulated by the expression or activation of many transcription factors^[3] resulting in heterogeneity.

The phenotypic heterogeneity exhibited is a functional diversity resulting from a differentiation strategy that is prone to environmental imprinting.^[4]

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Macrophages were known as large cells with profuse cytoplasm up to 25 μm in diameter, containing a single indented nucleus with two nucleoli. Three different types of in vitro differentiated macrophages can be distinguished. A small fast moving type, an elongated slow-moving type, and a round sessile type.^[5]

The main functions of macrophages comprise maintenance of tissue homeostasis and responding to microorganisms, mediating innate immune responses and contributing to adaptive immunity via antigen processing.

Macrophages are chief sources of cytokines, and of co stimulatory molecules that play a major role in the systematic activation of T and B cells. They are involved in many inflammatory disease conditions such as rheumatoid arthritis.

THP1 Monocyte / Macrophage Cells: THP-1 cells are premonocytes that perpetrate to the monocytic cell lineage. They grow in suspension and do not adhere to the plastic surfaces of the culture plates. The human monocytic cell line THP-1 may be differentiated to a mature macrophage-like state, and these cells possess many of the physiological properties of primary monocyte-derived macrophages.^[6] Various stimulating factors were used for the differentiation of the monocytes to macrophages. Diageanult et al., 2010 used both Phorbol 12 myristate 13 acetate (PMA) and Vitamin-D3 stimulating factors in the differentiation

of THP1 monocytes to macrophages and PMA was more effective than vitamin-D3.^[7]

Studies by Qin et al., 2012 showed that suspension cell types THP1, resembling circulating primary monocytes were induced by PMA to macrophages. PMA treated cells were shown to stop mitosis, adhere to the culture vessel and differentiate into mature macrophages.^[8]

PBMC:

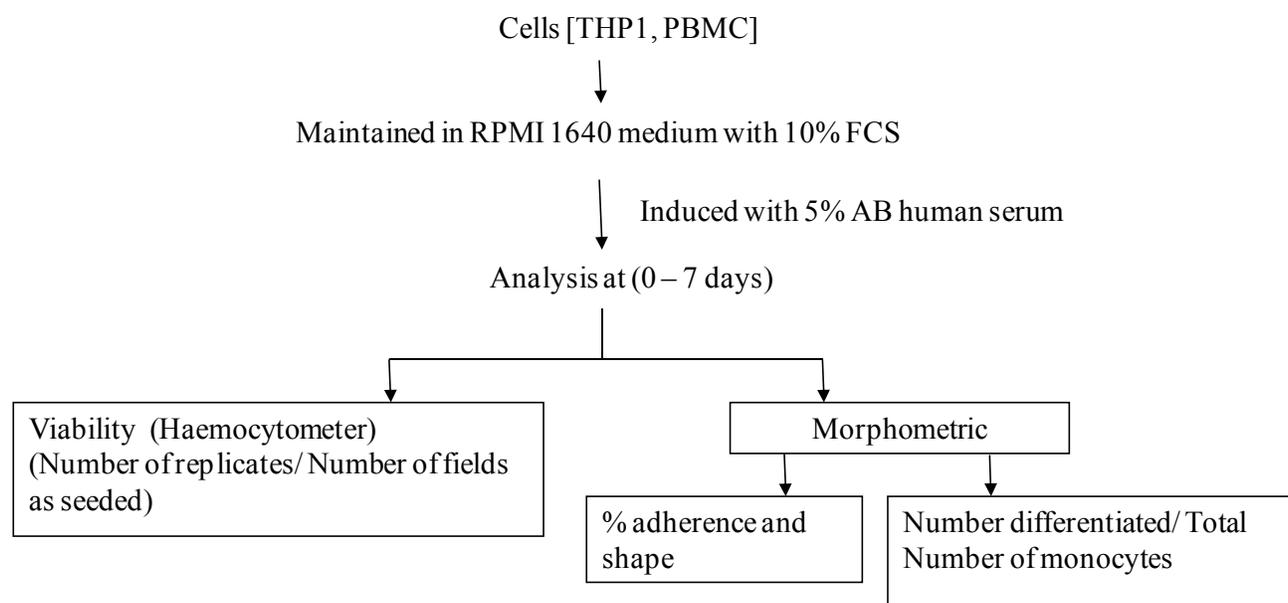
Macrophage colony stimulating factors and human serum were used as a stimulating factor in the differentiation of monocytes isolated from peripheral blood.^[9] The addition of human serum gave mixed populations of macrophages.

The main objective of this study was to describe the phenotypic changes during differentiation of monocytes to macrophages when induced with serum (FCS and HS) in two cell cultures namely:

- (i) Human peripheral blood mononuclear cells.
- (ii) THP1 cells (in vitro)

The time course for differentiation post-induction morphometric end points during differentiation and the maximum yield of mature macrophages was determined. These experiments were performed to optimise growth and differentiation from PBMC a inherently variable source and THP1 under our lab conditions. Such a study could be used for determining the role of drugs in inflammatory diseases like RA.

Schematic: Study design for time course for conversion of cells to macrophages in two cell types viz PBMC and THP1



MATERIAL AND METHODS

Study design:

Isolation of Peripheral blood mononuclear cells: (PBMC)

Five ml of peripheral blood was collected in EDTA vacutainers from healthy volunteers, ranging in age from 18 to 50 years after getting the consent (Institutional Ethical clearance No.IEC-NI/10/JUNE/17/16, dated 23.6.2010). The healthy individuals who are free from articular, bone, liver, endocrine or chronic disorders were included in this study. Human peripheral blood mononuclear cells (PBMC) consisting of lymphocytes and monocytes were separated by Ficoll (Sigma Chemical Co., India) density gradient centrifugation^[10] by layering the peripheral blood on to the gradient and centrifuging at 2500 rpm for 20 mins. Peripheral blood monolayer was isolated and transferred into sterile falcon tubes. Cells were washed three times with phosphate buffered saline and were resuspended in cell culture media.

Media for culture: Routinely isolated cells were cultured in Roswell Park Memorial Institute Medium (RPMI) 1640 (Invitrogen, India) supplemented with 10% fetal calf serum (FCS), 25mM HEPES, 2 mM L-glutamine, 100 IU/mL penicillin, 100 mg/mL streptomycin, kanamycin 20 μ g/mL, fungizone 20 μ g/mL. (Himedia, India).^[11] For culturing THP1 cell lines the same media was amended with β -mercaptoethanol (0.5mM).^[12]

Cell viability: This was assayed for PBMC and THP1 cultures using trypan blue (0.2%) in a haemocytometer.

Estimation of differentiation of macrophages:

Isolated PBMC cells (5×10^5 cells/mL) or the human monocytic THP1 (2.5×10^4 cells/mL) passage #22 cell line (National Center for Cellular Sciences, Pune.) was seeded in 24 well plates and maintained in 1ml RPMI 1640 media supplemented with 2 mM L-glutamine as given above. Cells were incubated at 37 $^\circ$ C in 5% CO₂.

PBMC cells were allowed to adhere and the population of cells differentiating to macrophages was determined over a 6 day period by washing off floating cells with PBS. The adherent population was counted every 6 days by trypsinizing and staining with trypan blue in a haemocytometer.

To determine the growth of induced THP1 cell suspensions, the cells were removed by aspiration and counted by trypan blue method in haemocytometer.

Morphological changes in cell culture:

The cell suspensions 1×10^5 / mL were supplemented with 3ml RPMI medium and 10% fetal calf serum in 6 well plates and incubated at 37 $^\circ$ C for 24 hrs in an incubator with 5% CO₂. The non-adherent lymphocytes were subsequently removed by washing with PBS. Differentiation was induced by adding fresh complete RPMI1640 media and 5% normal human serum. Cell morphology and growth in the wells was observed for 14 days under inverted phase contrast microscope at 20X magnification^[9] as it was necessary to change the medium once in three days. Cell size measurements were made on 3rd, 4th, 5th and 7th day after induction by using image pro 3 software on an average of 5 to 6 measurements per field.

For the induction of THP1 cell differentiation, cells (1×10^5 /mL) were seeded in 1ml C-RPMI 1640 medium with 5% human serum in 24 well plates which was changed every 24 hr for the next 3 days. The morphological characteristics were observed of THP-1 cells grown with (differentiated) and without human serum (undifferentiated) under inverted phase contrast microscope (Nikon, USA).

Statistical analysis:

The experiments were carried out in triplicates and the data were expressed as mean \pm SEM. The statistical analysis was performed using MS Excel software. The cell size measurements were made by using image pro3 software.

RESULTS

Fetal calf serum supplements, growth factors and cytokines provide nutrients for cell growth and differentiation. Differentiation in the two cell types

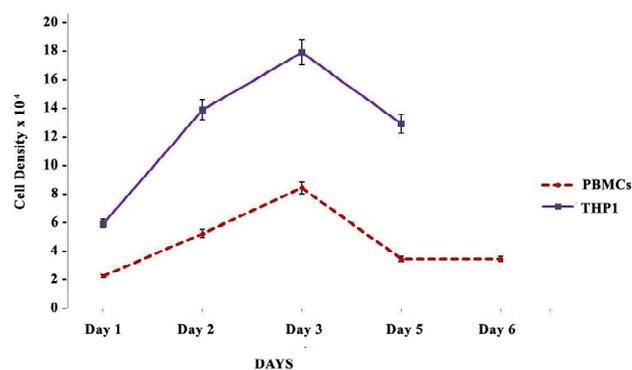


Fig.1 Population of cells differentiating into macrophages from (a) PBMCs (- - - ; adherent population) (b) THP 1 cells (—; total) over a period of 4-6 days. Data are presented as mean \pm SEM of triplicate samples.

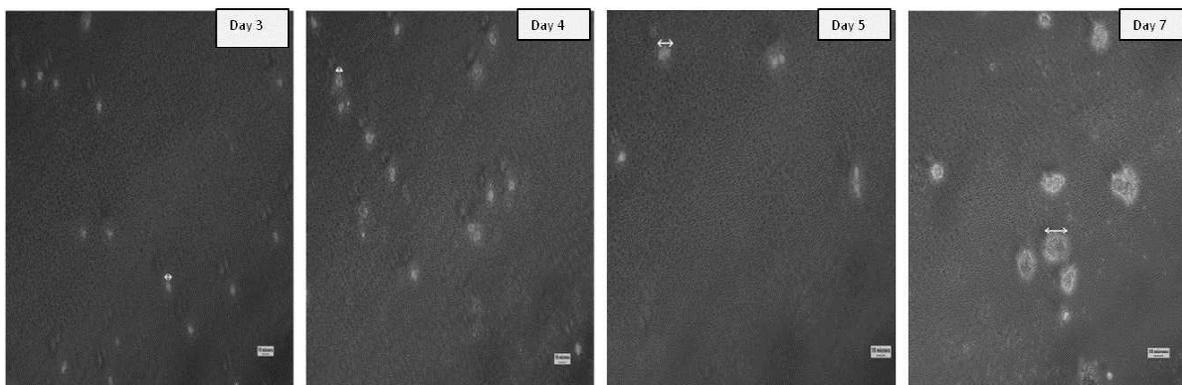


Fig.2 Morphology of differentiated monocytes cultured in RPMI 1640 supplemented with 10%FCS and 5% normal human serum on different days showing change in shape and increase in size of cells. The scale denotes 10 microns.

(PBMC and THP1) cells was monitored after 24 hrs based on the population of seeded cells showing adherence to the substrata. Fig.1 showed the population of peripheral blood mononuclear cell (PBMC) differentiating to macrophages estimated 24 hrs after adhesion in 24 well culture vessels.

Out of 5×10^5 PBMC cells/mL seeded, 2.3×10^4 monocyte cells/ mL adhered to culture vessel on first day. The numbers of adherent cells increased to 5.3×10^4 cells/ mL on second day. A maximum population of (8.5×10^4 cells/mL) was observed on day 3 after which it declined. The data are presented as mean \pm SEM of triplicate samples.

In THP1 cells a maximum population of 17.5×10^4 cells/ml as macrophages was observed on day 3 after which it declined. The data are presented as mean \pm SEM of triplicate samples as shown in Fig 1.

As seen from Fig 2, average size of cultured cells increased from $6 \mu\text{M}$ on day 3, to $8\text{-}11 \mu\text{M}$ on day 4; $13\text{-}17 \mu\text{M}$ on day5, with a maximum of $31 \mu\text{M}$ on day 7 when induced with 5% normal human serum.

Fig 3 shows the morphological changes observed and images were taken at 200x magnification with inverted phase contrast microscopy. Undifferentiated cells were spherical in shape (Fig. 3a) with an average diameter of $16 \mu\text{M}$. Cells differentiating after exposure to human serum became elongated with small projections observed on cell surface (Fig. 3b). Average diameter observed for such differentiating cells was $23 \mu\text{M}$. The diameter of the cell increased and reached a maximum size of $31 \mu\text{M}$ on day 7 for PBMC.

DISCUSSION

Monocytes were freshly isolated from peripheral blood of healthy donors by Ficoll density gradient centrifugation. Macrophage heterogeneity is influenced by differentiation state with marked differences

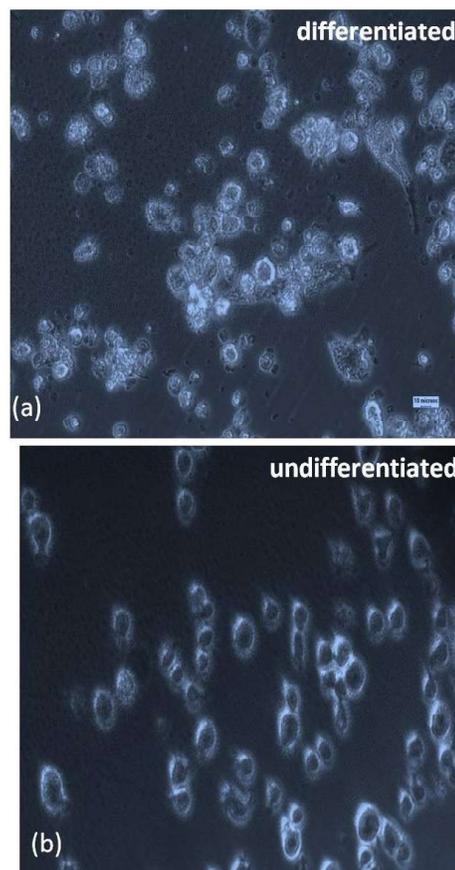


Fig.3 Morphological changes of THP1 cells cultured with RPMI 1640 supplemented with 10% FCS. Cells were induced with 5% human serum (differentiated; a) or without human serum (undifferentiated; b) for 7 days. The scale denotes 10 microns.

between monocytes and macrophages.^[13] Several methods have been described for the generation of macrophages in vitro, and depend upon the contribution of a variety of factors possibly influencing the differentiation process, such as serum (content as well as source) and growth factors.^[14-18]

Cell culture factors affecting differentiation of PBMC to macrophages to identify the optimal

conditions for maximum yields of macrophage was the main objective of the study. Since differentiating monocytes (normally suspensions) are characterized by two important features viz., adhesion to culture vessel and change in morphology, and these two parameters were the end points in our observations.

Monocyte derived macrophages presented a unique morphology depending on the culture media. Induction of monocyte with 5% normal human serum showed marked changes in the cell morphology. It was observed for 14 days and the cells were photographed at 200x magnification with inverted phase contrast microscopy. The identification of the markers for the differentiation of macrophages by PMA in THP1 by Diageanult et al., 2010^[18] showed that increased cell differentiation after 3 days with increased cytoplasmic volume resembles the monocyte derived macrophages. In the same study the PBMC cells were induced with 10% of human AB serum showed differentiated to macrophages within 14 days.^[7] A study by Liang et al^[24] showed that the differentiated macrophages are larger and more granular. These cells became adherent and exerted macrophage like characteristic after induction with 10% AB human serum. Our study results confirm the same observation in 5% AB human serum.^[19]

The increase in size of the cell showed the complete differentiation of monocytes to macrophages. Macrophages are large, round cells that contain a central round nucleus and have abundant clear, often vacuolated, cytoplasm. As the monocyte differentiates into the macrophage, the cell enlarges in size.^[20] It is one of the largest cells present with a diameter of 21 μ m and above as reported. Our results in this study based on cell size also confirmed the differentiation of monocytes to macrophages when induced with human serum (5%).

THP 1 cells are premonocytes committed to monocytic cell lineage. They grow in suspension and do not adhere to plastic surfaces of cell culture plates. Thus for the induction of differentiation to macrophage like cells these cells were cultured in the presence of serum for 4 days. After 24 hrs of culture with human serum, the cells adhered to the culture plates and had morphological characteristic of macrophage.^[21] The adherent THP1 cells showed remarkable phenotypic changes, not only morphologically but also functionally. Differentiated THP1 macrophages have been used as an invitro model of human macrophages involved in inflammatory disease.^[22] Hence this cell line was chosen to compare the stages in differentiation from monocyte to macrophage with PBMC.

Both THP1 and monocyte from PBMC showed maximum population of macrophages on day three (Fig 1). The population of THP 1 monocyte cells increased 2 fold on day three than the population of monocytes in PBMC. Yield in THP1 cell line was higher than PBMC as the cell lineage is uniform in cell lines than the isolated cells. Maximum population was observed on day 3 in both THP1 and isolated cells when grown in RPMI with 10% FCS. The cells differentiated well in RPMI 1640 supplemented with 10% FCS and 5% normal human serum. Marked changes in the morphology included adherence of cells that were attached to the surface of the culture vessel and also the changed shape of the PBMC cell. The clear round shape of the cell changed to irregular surfaced cells in both PBMC and THP1 cells. The diameter of the cell increased and reached a maximum size of 31 μ M on day 7 for PBMC.

Study results showed that the addition of human serum induced cell differentiation and unique morphological changes in monocytes and THP1 cells and was comparable to the reports by Musson and Andereeson et al.^[23,24] Hence it was confirmed that on day 3 macrophage yields were high and could be used for anti-inflammatory assessments. Fetal calf serum and human serum are rich in proteins, growth factors, hormones and cytokines, providing nutrient for the growth of the cells. Addition of human serum along with fetal calf serum induced the differentiation of monocytes to macrophage. Morphological differences were also confirmed by measurement of diameter of the cells with inverted phase contrast microscopy. The results from this protocol would help us in our research on Nuclear transcription factor kappa B (NFkB) signal transduction pathway in rheumatoid arthritis using invitro cells.

CONCLUSION

This is a preliminary study to optimize the differentiation of monocytes to macrophages and morphology of PBMC and THP 1 cell to our laboratory condition. Peripheral blood mononuclear cells isolated from human blood were induced with 10% FCS to differentiate by adhesion to culture vessels and was accompanied by morphological changes. THP1 cells were induced to differentiate with 5% human serum which showed changes in morphology and size. In both culture types, a maximum of 8.5×10^4 cells/ml with PBMC and 17.5×10^4 cells/ml of THP1 cell lines on third day post induction was observed. Increase in cell size up to 31 μ M for PBMC and 23 μ M of THP1 and typical alterations in morphology were an

important characteristics seen up to day 7 of culture in both cells. It was clear from our observations that adhesion, change in shape and size were the noticeable features for obtaining macrophages in culture. This study has revealed that the 3rd day post induction with the use of AB human serum is ideal for the cells using this as a model to study the signal transduction pathway in rheumatoid arthritis.

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EFFECT OF LOCATION OF CEREBRAL INFARCTION ON FUNCTIONAL RECOVERY FOLLOWING STROKE

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ABSTRACT :

Background: Effect of location of infarct on motor and functional outcome is elusive due to methodological limitations in previous studies. The purpose of this study is to evaluate the effect of different cerebral infarct locations on motor scores and functional abilities.

Method: 113 first time cerebral infarct with hemiplegia/paralysis, were observed for first three months post stroke. Infarct location identified with Diffusion Weighted Images of Magnetic Resonance Imaging (MRI) and categorized as cortical, subcortical and transcerebral. Stroke Rehabilitation Assessment of Movement and Motor Assessment Scale were used as outcome measures. Upper and lower limb motor scores, hand functions, sitting to standing, gait and stair climbing were tested on 7th day and at the end of 3rd month post stroke. Wilcoxon signed rank test and Kruskal Wallis test were used to test motor scores; Mann Whitney U test was used to test effect of side of infarct. Odds ratio

was used to test association between variables and infarct location.

Results: Cortical infarcts, subcortical infarcts isolated to corona radiata or gangliocapsular region had better outcome. Transcerebral infarcts had poor outcome. Cortical infarcts had greater association with all functional variables than other infarct locations. Stair climbing was difficult function to achieve; sitting to standing was easier to achieve by majority of patients irrespective of the groups. Majority of the patients with sub cortical and transcerebral infarcts had partial movement control at 3 months post stroke. Absence of motor control was found in few patients with transcerebral infarct at 3rd month.

Conclusion: Cerebral infarct locations have impact on motor scores and functional outcomes.

Key words: Cerebral infarct, Functional recovery, Rehabilitation

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INTRODUCTION

Stroke is reported as the third commonest cause of death worldwide after coronary artery disease and cancer.^[1] Stroke can result in varied motor, sensory and cognitive impairments. The type and severity of impairments differ with location of lesion in brain. Studies state location of lesion as the best predictor for functional recovery.^[2-5] As earlier studies suggest a relation between functional improvement and location of lesion, the results of such studies can be used to guide rehabilitation professionals to focus on expected disabilities, and set a realistic goal for rehabilitation. However majority of the studies related to stroke rehabilitation focused on exercise protocols based on impairments irrespective of location of lesion. We as well felt that hand functions were not evaluated in relation to different location of lesion.^[5,6]

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There is dearth of literature related to effect of infarct location on functions like walking, sitting to standing and stair climbing.^[7] Few studies have used measures like Barthel Index and Functional independence measure to quantify functional recovery. These measures may reflect performance of the function irrespective of the contribution from affected side. If patient is independent even with deviations in performing functions, it will be graded with a maximum score in these measures. If compensations by normal side is not eliminated patient will learn not to use the affected side. Hence results of such studies will not be useful in planning impairment level therapeutic approach.

We hypothesized that measuring functional changes in relation to location of cerebral infarct, using measures for motor outcome will reflect functional limitations due to motor impairments, eliminating compensations. We tested changes in motor scores of upper limb and lower limb, motor activities of hand, walking, sitting to standing and stair climbing in relation to locations of cerebral infarction during first 3 months of rehabilitation, using motor outcome measures.

MATERIALS AND METHODS

The Study was approved by Institutional Ethics Committee of the University. Patients admitted in our medical centre with first time unilateral hemispheric infarct confirmed by MRI (Magnetic Resonance Imaging) having hemiparesis/plegia were screened for inclusion. The patients aged between 30 to 80 years, having comprehension sufficient to understand commands to perform components of outcome measures were included in the study. Exclusion criteria were: thrombolytic therapy on admission, presence of cerebellar or brainstem infarcts, presence of perceptual deficits, presence of other neurological, orthopedic or cardiopulmonary problems limiting functional recovery. Informed consent was obtained before data collection.

All the patients included in the study were receiving physiotherapy during the hospital stay and were advised to continue physiotherapy at home. Adherence to physiotherapy at home was confirmed through telephone, attending therapist and during their review at 4 to 6 week post stroke. As our intention was not to measure the outcome of therapy given, details were not recorded regarding physiotherapy. Stroke Rehabilitation Assessment Measure (STREAM), and Motor Assessment scale (MAS) were used as outcome measures. Both are valid and reliable measures for impairments in stroke.^[8-11] The measures were administered on 7th post stroke day and at 3rd month post stroke. The STREAM was used in this study, as it is one of few outcome measure tested for sensitivity to change making this scale to reflect changes in motor control in acute stroke patients. We used advanced hand function components of Motor assessment scale as components for evaluation of prehensions are not in STREAM. Earlier studies have not used scales which can measure motor components alone, as well as measures tested for sensitivity to change.

Radiologist identified the location of the infarct in Diffusion Weighted Image (DWI) of Magnetic Resonance Imaging (MRI) during 48 hrs post stroke. The infarcts were classified as cortical infarcts, sub cortical infarcts and transcerebral infarcts. Sub cortical infarcts are those isolated to gangliocapsular region, corona radiata and centrum semiovale. Transcerebral infarcts are infarcts spread across cortical and subcortical structures. The infarcts were further classified based on predominance of infarct location as in table 3.

Based on STREAM and MAS scores the dependent variables were categorized for evaluation as in Table 4. Motor scores for upper and lower limbs were

categorized based on STREAM as: No movement (0%), movement with synergy and partial movements (5% to 95%) and isolated movements possible (100%). Hand functions were quantified based on advanced hand function components of Motor Assessment Scale and categorized as reduced score and maximum score. Reduced score included those with score less than 6 and maximum score was indicated by 6. Other functional variables: walking, sitting to standing and stair climbing were categorized as absent, abnormal, and normal based on mobility scores of STREAM.

STATISTICAL ANALYSIS:

The changes in motor scores of upper and lower limbs (STREAM) between 7th day and 3 month post stroke, within three major infarct locations was tested with Wilcoxon Signed Ranks. The change in motor scores between the infarct locations at 3rd month was tested with Kruskal-wallis test. The pooled motor scores of all the three locations at 3rd month for right and left side were evaluated with Mann-Whitney U test. Odds ratio was calculated to test the association between locations of infarct with variables: upper and lower limb motor scores, functions of hand, sitting to standing, walking and stair climbing. Spearman's rank correlation was used to correlate functional level at 7th day and 3 month post stroke among the infarct location. Alpha was set at 0.05 for statistical testing.

RESULTS

Motor scores change within and between the groups:

Table 1 provides profile of patients observed in the study. Motor scores on 7th day and 3rd month post stroke tested with Wilcoxon Signed Rank test in all the three infarct types was statistically different ($p < 0.05$). Cortical infarcts had minimal motor disability at the end of three months followed by subcortical and transcerebral infarcts (Table 2 & 3). In sub cortical infarcts, infarcts covering coronaradiata and centrum semiovale had poor outcome followed by infarcts spread over coronaradiata and gangliocapsular region. In transcerebral infarct, frontotemporo-parietal lobe, coronaradiata and gangliocapsular region infarcts had

Table 1: Patient Profile & Location of Infarct

Age (mean yrs)	56.42
gender M:F	70:43
Right Side	70
Cortical	22
Subcortical	59
Transcerebral	32

Table 2: Mean and SD of motor scores at 7th day and 3rd month (3mth).

	ST UL 7 th day*	STLL 7 th day*	STUL 3 mth*	STLL 3 mth*
Cortical	80.9 (17.7)	87.4 (26.3)	97 (6.4)	98.4 (4.7)
Sub cortical	38.8 (35.6)	51.1 (38.4)	75.5 (32)	80.6 (31.3)
Transcerebral	15.4 (25.4)	32 (29.4)	49 (30.2)	46 (36.8)

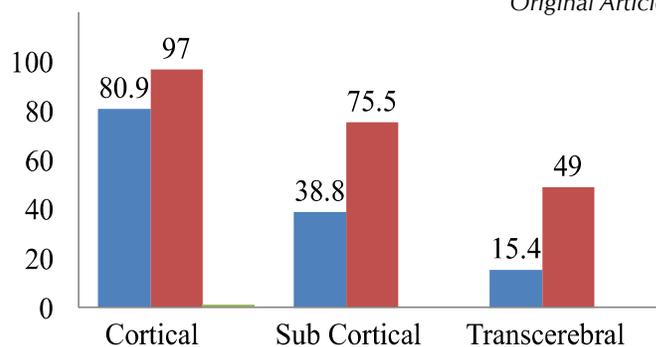
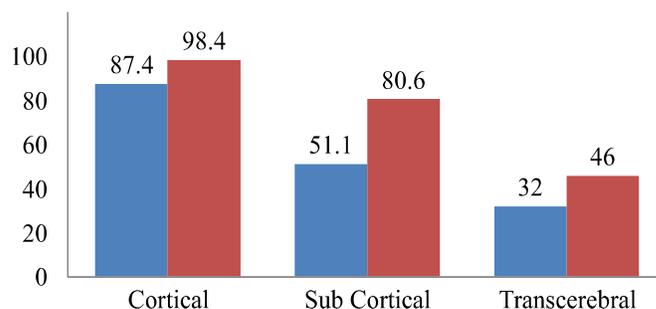
*Scores given as percentage of maximum score of 20

Table 3: Mean motor score at 3rd month in reference to predominance of infarct.

Location (number)	Motor scores* at 7th day		Motor scores* at 3rd month	
	SUL	SLL	SUL	SLL
Cortical				
Frontal (9)	87	88	99	96
Frontoparietal (7)	86	95	94	100
parietal (6)	65	75	85	95
Subcortical				
GC (13)	37	48	84	88
CR (14)	66	73	97	99
GC & CR (26)	26	42	63	71
Centrum semiovale (2)	92	100	100	100
CR & centrum-semiovale (4)	0	8	34	40
Transcerebral				
Frontopariatal & CR(2)	40	50	77	85
Frontoparietal, GC & CR (20)	17	19	52	53
Frontotemporal & GC (2)	32	50	62	65
Frontotemporo parietal lobe CR & GC (8)	3	4	31	15

*Scores given as percentage of maximum score of 20

SUL STREAM Upper limb components; SLL STREAM Lower limb components; GC Gangliocapsular; CR Caronaradiata

**Fig.1: Upper limb motor scores among infarct locations; Y axis denotes percentage score for STREAM upper limb components. (Blue 7th day Red 3rd month)****Fig. 2: Lower limb motor scores among infarct locations; Y axis denotes percentage score for STREAM Lower limb components**

greater motor disabilities at the end of three months (Table 3). These infarcts are large infarcts among the study group. The Kruskal-wallis test showed that the motor scores between cortical, subcortical and transcerebral infarcts were different at 3 months post stroke (upper limb scores $H = 24.47$, d.f 2, $p = 0.001$, and lower limb scores $H = 24.41$, d.f 2, $p = 0.001$).

We analysed the change in motor scores between 7th day and 3rd month among the three types of infarct. In Cortical infarcts the change in upper limb motor score was 12.9% (95% CI 0.9 – 24.8), and lower limb score was 10% (95% CI 2.2 – 22). In sub cortical mean change in upper limb motor score was 36.7% (95% CI 24.3 – 49.4) and lower limb motor score was 29.5% (95% CI 16.1 – 42.2). In transcerebral group the mean change in upper limb motor score was 33.6% (95% CI 19.6– 47.5) and lower limb motor score was 14% (95% CI -2.64 – 30.64). Each 5 percentage change is equal to one point change in STREAM upper and lower limb scores. The wider confidence interval could be due to the difference in motor scores among different infarct locations in cortical, sub cortical and transcerebral categories, e.g. sub cortical has sub classifications: gangliocapsular region, caronaradiata region, and infarct involving both gangliocapsular and caronaradiata.

Table 4: Odds ratio for variables based on 3rd month evaluation (data in Table 4)

Variables.	Cortical Vs Other two groups	Subcortical Vs Transcerebral
UL score 100%	5.1 (1.7 - 15.3)*	5.9 (2 - 17.6)
LL score 100%	3.6 (1.2 - 10.6)*	6 (2.2 - 16.1)
Prehensile functions	5.4 (1.2 -15.4)*	8.1 (2.2 – 29.7)
Normality in walking	9.3 (2 - 42.4)*	3.7 (1.4 - 9.2)
Normality in stair climbing	4.5 (1.5 - 13.3)*	3.3 (1.2 - 8.5)
Normality in sit to standing	infinity	4.2 (1.7 - 10.7)

*OR for cortical was calculated against pooled data of subcortical and transcerebral; OR for sub cortical was calculated against transcerebral.

Functional abilities among different infarct locations:

Table 4 with number of patients categorized based on the variables and infarct locations reveals stair climbing was difficult task to attain normality. Few patients (24%) with subcortical infarcts and 65% patients with transcerebral infarcts did not attain ability to climb stairs. Majority of the patients (72%) with cortical infarcts and 52% of the patients with subcortical infarcts climbed stairs without any observable deviations. Few patients who climbed stairs with handrails or other assistance were included under normality unless their pattern of climbing was abnormal. Sitting to standing was performed by majority of the patients in a near normal pattern; however few of them used arm rests to push themselves to stand. Gait deviations was observed in two patients with cortical infarcts, 22 (37%) patients with subcortical infarcts and 16 (50%) of the patients with transcerebral infarcts at the end of three months. Six patients were not ambulant in transcerebral infarct group. Non ambulant patients were not observed in cortical and subcortical category. Hand functions were evaluated using upper limb component of motor assessment scale (UL-MAS). Majority of the patients with cortical infarcts (72%) were able to perform all the components of UL- MAS. Patients with

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*OR for cortical was calculated against pooled data of subcortical and transcerebral; OR for sub cortical was calculated against transcerebral.

transcerebral had major deficit in hand function followed by patients with subcortical infarcts. Analysing the motor scores revealed that around 1/3 of patients with sub cortical infarcts and around 2/3 patients with transcerebral infarcts had partial and abnormal movement components present in upper and lower limb; only in few patients with cortical infarcts we observed incomplete motor control. Patients with lack of motor control at the end of three months were observed in subcortical and transcerebral infarcts.

Odds ratio was calculated to measure the degree of association. Patients with cortical infarcts had greater association for 100 % in upper limb score (OR = .5.1), 100 % in lower limb score (OR = 3.6), hand function scores (OR 5.4), normality in walking (OR = 9.3) and normality in stair climbing (OR = 4.5) than subcortical and transcerebral infarcts. Sub cortical infarcts had significant association for better outcome in all the variables when compared with transcerebral infarcts (Table 5).

Influence of side of infarct on motor out come at 3months tested by pooled data of all three types of infarct. Side did not have any impact on motor scores of upper limb (U = 1346, p = 0.35) and lower limb (U = 1398, p = 0.52) at three months post stroke.

Table 5: Number of patients under motor and functional variable among infarct locations

	Cortical (n=22)	sub cortical (n = 59)	Trans- cerebral (n = 32)
UL motor scores			
score 0	0	1	1
score 5% - 95%	5	27	26
Score 100%	17	31	5
Prehensions			
Reduced score	6	32	29
Maximum score	16	27	3
LL motor scores			
score 0	0	1	2
score 5% - 95%	3	21	23
Score 100%	19	37	7
Gait			
absent	0	0	6
Abnormal	2	22	16
Normal	20	37	10
Stairs			
Absent	0	14	21
Abnormal	5	14	3
Normal	17	31	8
Sit to stand			
Absent	0	0	2
Abnormal	0	15	17
Normal	22	44	13

UL – upper limb; LL – lower limb

Spearman's rank order correlation between 7th day motor scores and 3rd month motor scores of upper and lower limb was 0.7 and 0.8 respectively.

DISCUSSION

We found location of infarct had influence on motor scores, similar to findings in earlier studies. Location of infarct had variable influence on hand functions, walking, sitting to standing and stair climbing; findings in earlier studies in this regard were elusive. In our study population cortical infarctions had greater motor scores and minimal functional disabilities than patients with infarct in subcortical region or transcerebral infarction. Earlier studies too state better outcomes with cortical infarction. The tendency for such recovery could be due to compensations by activation of dormant motor areas of ipsilateral and contralateral hemispheres, as corticospinal tract originates from different parts of the brain apart from primary motor cortex.^[12-15] The analysis shows parietal

lobe infarcts had lower motor scores. Our findings were similar to previous studies by Pantano et al. (1996)^[14] and Nelles et al. (1999)^[16] These earlier studies suggest role of parietal lobe in motor planning apart from spatial perception as a reason for poor motor score in the presence of a lesion. The motor scores of subcortical infarct were higher than transcerebral infarcts. The infarcts spreading across coronaradiata and centrum semiovale, had lower motor scores among this group of patients. Shelton et al, (2001) states such infarcts can disrupt facilitation of secondary motor system resulting in poor recovery. Isolated infarcts in internal capsule and coronaradiata resulted in better outcome compared to infarcts in both locations. The lesion in both areas could be compared to "double crush" phenomenon usually described in two levels of lesion in peripheral nerve resulting in poor outcome.^[5] Transcerebral infarcts had greater motor deficit among the patients studied; may be due to less compensatory mechanisms available for improvement in movements, resulting from large area of damage. In transcerebral infarcts larger infarcts involving major subcortical structures had poor outcome than predominance of infarct in cortical region.

We used STREAM as an outcome measure to evaluate motor function. In STREAM three point scale is used to measure motor performance; absent (0), partial/abnormal movement (1) and normal pattern of movement (2). The final score is given as percentage of Maximum score 20. Score 0 % represents absence of movement, score 5% to 95% represent presence of abnormal or partial movement in extremity and 100% represent ability to perform all test movements in normal pattern. Table 4 reveals majority of the patients (77%) had normal pattern of movements in upper limb components of STREAM. Around 52 % of patients in subcortical and 15% patients with transcerebral infarcts regained normal pattern of movements for STREAM components. Number of patients who had normal pattern for lower limb components are similar that of upper limb, in all three types of infarct. Our results are similar to study by Shelton (2001) except that percentage patients with near normal movement patterns reported in the study was smaller than our findings.^[5] The assessment time (around 2 months) and variations in location of infarcts in Shelton's study could be a reason for such differences. The recovery of near normal pattern of movement in majority of cortical patients could be due to compensations from dormant motor areas; on the other hand poor recovery in subcortical infarcts could be due to damage to

pathways reducing the compensatory mechanisms to take effect.

Majority of patients with cortical infarcts (72 %) recovered prehensile functions at 3 months post stroke. Some patients in sub cortical also improved in prehensions of hand (44%). Earlier studies on upper limb recovery did not report on recovery of hand functions.^[5] As mentioned in earlier studies, patients had difficulty in holding pen and doing activities of advanced hand function in MAS.^[9,17] Sitting to standing, walking and stair climbing are closely associated functions. We looked into the patient's ability to do these movements in normal pattern of movement. Earlier studies which reported about these functions didn't consider the motor components involved; graded them as dependent or independent based on assistance required. In this study we evaluated these functions based on the movement patterns which are reflections of motor ability. All patients with cortical infarcts were able to do sitting to standing at the end of three months. In subcortical infarct group 74% of patients and 40% transcerebral infarct group were able to do sitting to standing in normal pattern of movement. Majority of the patients in both cortical and subcortical infarct had normal pattern of walking pattern at the end of three months. Stair climbing was the function limited in all the three types of infarcts. We felt that stair climbing was limited in majority of the patients due to lack of focus of rehabilitation in this regard, as such activities can increase chances of fall; and can be negotiated with other means of transfers like lift.

Side of infarct did not influence the motor outcome in this study population. However studies, that left sided infarcts had better outcome than Right.^[14,18] The associated perceptual problems were considered as a rationale for poor outcome among right sided strokes. But in our study subjects with perceptual deficits were excluded. Spearman's rank order correlation revealed that motor scores on 7th day and 3rd month are associated. It can be assumed that those with severe motor impairment at 7th day had poor outcome at 3rd month. This finding is in concurrence with earlier studies stating that initial level of paresis as an important predictor for recovery.^[19]

As few studies concluded that location of lesion did not affect functional outcome^[14,20] and few studies state that location has an impact on motor and functional outcome, further research is required for clarity. Our study has revealed that location of infarct has a definitive role in motor and functional outcome. Studying functions as a reflection of motor impairment is

imperative to plan a training program. The results of this study projects a requirement for intensified rehabilitation for infarcts involving multiple subcortical area and transcerebral infarcts. Stair climbing needs attention and walking needs attention especially in subcortical and transcerebral infarcts. Hand function especially precision involving strength and endurance needs an attention than individual movements. We recommend such a training, as patients had difficulty in holding pen and performing tasks like placing dots and putting lines, which require sustained holding of pen. Though cortical infarcts had better outcome, infarcts in parietal lobe requires attention due the low score.

We did not take into account the size of infarct analysis of outcome in this study. Chen, et al (2000) stated that location and size of lesion has influence on motor outcome.^[21] Major variable in this study could be type and intensity of rehabilitation – physiotherapy, the patients underwent during the time of observation. We did not have control on this factor except for insisting patients to continue physiotherapy. We did not find evidence in earlier studies regarding effect of this variable. We suggest future studies with impairment specific protocols or concept specific protocols to control the influence handling skills of therapist.

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FACTORS AFFECTING HEALTH SEEKING BEHAVIOR AND MEDICAL PLURALISM AMONG RURAL POPULATION: IMPLICATIONS FOR HEALTHCARE PROFESSIONALS

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ABSTRACT

Background and Objective: Health is one of the prime concerns of mankind. Normally the context in which an individual lives it is of very vital and significant for his/her health status and quality of life. The objective of this study is to find out factors affecting health seeking behavior and medical pluralism among the rural population.

Method: A Total of 800 rural household samples had been selected for the study from the four districts of Karnataka using multistage stratified random sampling technique.

Result: There are some external determinants like level of education, caste, social status, culture, etc which can decide the health status of any person including environmental, local hospitals, behaviour of the doctors, infiltration of technologies etc. Also it

significantly depends on some internal factors including his /her inherited health culture, family background, geography, etc. Medical pluralism has mixed success in the studied area.

Conclusion : it is found that rural have unique health seeking behavior and mixed opinion about medical pluralism. A lot of internal external factors have been associated with their changing health behavior. This paper reveals factors like changing the level of education, occupation, new developmental activities etc affecting health seeking behavior of the rural people and medicalisation are strongly hitting the traditional medicinal system in the rural areas.

Key words : Culture, Health, Health behavior, Medical pluralism, Rural medicine.

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INTRODUCTION

Health is a pre-requisite for human development and is essentially concerned with the well being of the common man. Health is not only related to medical care but an integrated development of an entire human society. Health is not only a stable state of physical and natural well being but also in a true sense it involved the various other complex issues. As it is widely known that, Health is one of the imperative indicators shimmering the excellence of human life since time immemorial. Healthy community is very vital because it can set the destiny of the any society or country. Also healthy human resources lead to any type of development or any kind of achievement etc. Health is a very vital integrated component of an individual. Sometime collapse of health may even lead an individual towards an early death. Like this, unhealthy community may be a hinder for the holistic development of any society. Poor health status of any community may isolate that community from the national mainstream.^[1] Even though rural society is small and simple has his own inherited health beliefs and practice

concerning various health disorders and institutions. A more simple we can say health culture of an any society will consists of 3 major components.

1. Illness ideology
2. Body symbolism and
3. Ritual healing.

This health culture is a part of the sub culture with in a totally of population. This health culture will be a wider complex of the knowledge including roles, norms, values ideologies ,practice, rituals, etiology, local healers etc All these together responsible for having a particular type of health behavior hence in more precise term health culture can be termed as learned health behavior to separate it. From the aspect of health behavior caused by carious biological stimulation. Obviously health culture of a particular society will influence on the another society in the due course of time, this result in each are every unique health culture developing and main tainting its own distinctive practice.^[2]

Health behavior is a type of social behavior mainly influenced by the various socio-cultural issues. Understanding a disease/illness is not a medical subject rather it is mainly reliant on the common information of the concerned community. Also it would be vital to study HSB, from local community point of view. It

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is also opined that while studying HSB we need to focus on patient decision making within a given social and cultural context. Experts opines ^[3] "Medical Pluralism is an adaptation of more than one medical system or simultaneous integration of orthodox medicine with complementary and alternative medicine (CAM)..". Medical pluralism is a part and parcel of socially stratified and culturally diverse nature like rural society.^[4]

MATERIAL AND METHODS

Objectives:

1. To study the socio economic and the demographic profile of the studied population
2. To find out the various factors(caste, economic status etc), affecting treatment seeking behaviour and medical pluralism

This study had been conducted in the following Four districts (rural) of South Karnataka 1.Chamrajanagar Districts 2. Hassan 3.Coorg Districts 4.Kolar Districts were selected based on the recent health and family welfare survey. A Total of 800 household samples had been selected for the study using Multistage Stratified Random Sampling Techniques.

The proposed research study had Five major methodologies;

1. Survey;
2. Community Norms Study ;
3. Institutional Ethnography (NGOs /PHCs Bureaucratic Perspective);
4. Content Analysis ;
5. Case Studies

1. Data collected using Survey (with scheduled questioners) , 2. Interview (structured interview) 3. Case Study (using observations & unstructured interviews techniques). Participant observation (during rituals as an observer) have been followed . Survey was conducted among carefully chosen samples of 800 households. This survey had been carried out with scheduled questionnaires (194) covering the main themes. Respondents were asked to just describe the symptoms in his/her own words (lay perception) and later on classified with the help of a Physician. Here disease/illness had been just used as references for revealing specific health seeking behavior /health care seeking behavior of the respondents. Standardized survey questioners and interview schedules were used prepared by Metlab Demographic and Health Surveillance System.^[2] International Classification of

Diseases Health Related Problems (WHO,2004). Few in-depth case studies was done. Participant observation in case of household health rituals we also made

Sampling technique :

Multistage stratified random sampling technique was adopted for the selection of the villages from the Four districts for the current study. In first stage, Four (4) rural blocks were selected from each studied Four rural districts i.e 1 Hassan, 2.Kolar, 3.Chamrajanagar and 4.Kodagu districts on the basis of good, average and poor performance in RCH (reproductive and child health survey-2010) as per achievement of indicators during the previous assessment year and following

Table-1 : Socio-economic Profiles of the Respondents

Variables	N=800	Percentage
Age		
Just above 25	90	11.25
25-30	120	15
30-35	245	30.6
Above 35	345	43.1
Gender		
Male	451	56.3
Female	349	43.6
Educational level		
Primary education	368	46
High school	122	15.2
College	21	26.2
Illiterates	289	36
Family Income (in Rs.)		
5,000-7,000	411	51.3
7,000-10,000	213	26.6
Above 10,000	176	22
Caste		
SC	289	36.1
ST	45	5.6
OBC	367	45.9
Others	99	9.9
Marital Status		
Married	679	84.8
Unmarried	87	10.8
Widow/widower	34	4.2
Level of occupation		57.8
Primary	463	57.8
Secondary	252	31.5
Service	85	10.6

discussions with the district health officials. In the second stage, in each district 4 sub-centers (one each from the different PHC jurisdiction areas of the identified blocks) were randomly selected from the each Four blocks. Likewise 16 sub-centers were selected out of the total 93 sub-centers in all Four studied districts of the state.

In the third stage from each of the 16 selected sub-center areas, one sub-center headquarter (HQ) village and one non-HQ village were also randomly selected. Likewise 16 villages comprising 8 HQ and 8 non-HQ were identified out of total 50 villages in the identified sub-center areas from all the Four districts. From the each village a total of 50 Household samples have been selected for the current survey. Totally 16 villages, 800 households were selected for the current study. Further Five reputed NGOs working for the rural health care and for the case study purpose 25 local healers were also included based on the purposeful sampling technique for an in-depth study. Few PHCs and sub centers were also consulted.

The qualitative data has been analyzed using NUD*IST database software and the quantitative data have been analyzed using Minitab (2011) software. The thematically indexed discourse from various interviews, case studies and focus groups had been converted into an extended set of dummy variables and entered into the minitab database. Further, descriptive statistics, including standard deviation (SD), frequency and percentage were used to analyze the socio-demographic characteristics of the respondents. Chi-square had been used to examine the association between non-parametric variables. The Crosstabs procedure forms also used wherever necessary. To maintain the confidentiality of the participants codes were used by the researcher and ethical Clearance were obtained

Description about Variables :

1. Opinion about effect of caste was classified focusing major case groups including SC/ST/OBC
2. Treatment option was classified focusing Ayurvedic, Homeopathy/, Sidda, Uani and the Western
3. Effect of uncovered determining factors was classified focusing was classified focusing Social Support, Networks, Social Environments, Physical Environments, Personal Health Practices etc
4. Opinion about effect of economic status effects was classified Low, Middle , High, and Elites groups
5. Treatment patterns was classified focusing Income, Occupation, Level of Education Gender, Social networks etc

RESULT

In case of demographic composition 30% are belonging to the age group of 30 - 35 years whereas 43% are belonging to the age group of above 35 years. In gender wise 56% were male and 43% were females. Next, 46% are them have completed primary education and 36% are illiterates. Further, 51% of them are having the monthly income of Rs. 7000/ whereas 22% of them have an income an income of above Rs.10000/- pm. Next, it is found that 36% of them belonging to Scheduled caste and 45% belong to the other backward castes group. It is also noted that 57% of them are working in primary sector and 10% are in service sector (Tab-1). In case of opinion about influences of socio-economic status on health seeking behavior it is found that 25% of them opined economic status effects very much effects whereas 25% opined social status does affects health seeking behavior while 24% opined caste plays an imperative role. Next 7% of the respondent's opined social network is a crucial issue while 7% of them felt gender plays a vital role and 8% of them said level of education plays very crucial (Tab-2).

Table -2 : Opinion about Influences of Socio-Economic Status about Health Seeking Behavior of the Respondents

Response	Frequency	%
Economic status affects very much	200	25
Social status does affects	201	25.1
Caste plays an imperative role	195	24.3
Gender counts s a lot	56	7
Social network is a crucial issue	58	7.2
Level of education is most vital	67	8.3
All the above	23	2.8
Total	800	100

Regarding percentage distribution of treatment option by Caste, Religion and Age characteristics 45% of SC/ST people inclined for folk medicine 21% for

Table-3 : Percentage Distribution of Treatment Option by Caste, Religion and Age

Characteristics	Treatment options										X ²	p	
	Category	Subgroups	Folk Medicine		Western		Home/Self Medication		Ayurvedic/ Homeopathy				Total
			Frequency (f)	%	f	%	f	%	f	%			
Caste	Scheduled Caste/Tribe	93	45.1	44	21.3	37	17.8	32	15.5	206	11.595	0.03	
	Backward Castes	70	24.6	136	47.8	54	19	24	8.4	284			
	Others	61	19.6	180	63.3	49	17.2	20	6.4	310			
	Total									800			
Religion	Hindu	229	29.6	379	49	78	10.1	86	11.1	772	703.606	<0.001	
	Muslim	8	33.3	12	50	2	8.3	2	8.3	24			
	Others	1	25	2	50	0	----	1	25	4			
	Total									800			
Age	20-35	45	26.6	107	63.3	10	5.8	7	3.5	169	150.139	<0.001	
	30-45	123	24.2	345	68	30	5.9	10	1.9	508			
	45-65	43	35	66	53.6	6	4.8	8	5.2	123			
	Total									800			

Table-4 : Percentage Distribution of Factors Determining Different Treatment Patterns of the Respondents

Determining Factors												X ²	P
Variables	Western		Folk Medicine		Ayurvedic		Homeopathy		Home remedy				
Factors	f	%	f	%	f	%	f	%	f	%			
Income and Occupation	10	18.5	22	22.6	22	50	21	23.8	12	6.8	38.51	<0.001	
Education	14	25.9	15	15.4	6	13.6	10	11.3	6	10.5			
Gender	5	9.2	12	12.3	4	9	14	16	11	19.2			
Social networks	5	9.2	15	15.4	5	11.3	12	13.5	13	22.8			
Social status	14	25.9	11	11.3	2	4.5	8	9	12	21			
Other	2	3.7	13	13.4	2	4.5	12	13.5	3	5.2			
Total	54	100	97	100	44	100	88	100	57	100			

western 17% for self and 15% for Ayurvedic/homeopathy. In case of OBC group 24% inclined for folk medicine 47% for western 19% for self and 8% for Ayurvedic/homeopathy. In case of religion wise(Hindu) reply 29% inclined for folk medicine 49% for western 10% for self and 11% for Ayurvedic/ homeopathy. In

case of Muslim 33% inclined for folk medicine 50% for western 8% for self and 8% for Ayurvedic/ homeopathy. Further, In the age group of 20-35 it is found that 26% of them inclined for folk medicine 63% interested in western 5.8% would like to opt self medications and 3% for Ayurvedic/ homeopathy. And in the age group

Tab-5 : Economic Group Wise Opinion about Medical Pluralism

Category	Low		Medium		High		Elites		X ²	P
	f	%	f	%	f	%	f	%		
It is more useful to the poor patients	203	51.1	90	32.1	25	25.7	8	30.7	71.12	<0.001
Gives More options to the patients	58	14.6	54	19.2	24	24.7	6	23		
Rate of success of healing will be more	78	19.6	67	23.9	10	10.3	5	19.2		
All the above	40	10	34	12.1	27	27.8	5	19.2		
May lead low quality	8	2.01	24	8.5	8	8.2	1	3.8		
Create more confusion to the patients	10	2.5	11	3.9	2	2	1	3.8		
Total	397	100	280	100	97	100	26	100		

Table-6 : Effect of Uncovered Determining Factors on Health Seeking Behavior Patterns of the Respondents**Determining Factors**

Factors	Social Support Networks		Social Environments		Physical Environments		Personal Health Practices		Quality of Health care Services;		x ²	P
	f	%	f	%	f	%	f	%	f	%		
Western	35	35.1	26	18.5	35	25.7	15	8.8	105	41.3	116.791	<0.001
Folk medicine	28	28	53	37.8	36	26.4	74	43.5	47	18.5		
ISM	10	10.1	23	16.4	24	17.6	44	25.8	25	9.8		
Over the counter	10	10	25	17.8	15	11	12	7	45	17.7		
Home remedy	11	11	6	4.2	22	16.1	18	10.5	24	9.4		
Faith healer	4	4	4	2.8	2	1.4	4	2.3	4	1.5		
Other	2	2	3	2.1	2	1.4	3	1.7	2	0.7		
Total	100	100	140	100	136	100	170	100	254	100		

of 30-45 it is found that 24% of them inclined for folk medicine 68% interested in western 5.8% of them would like to opt self medications and 1.9 % for Ayurvedic/homeopathy (Tab-3). Regarding economic group wise opinion about causing illness/diseases 31% low, 8% middle class 10% higher class and 11% elites

respondents opined Cosmology powers are the main responsible for causing any sort of health problems. Next 11% low 45.% middle class 47% higher class and 61% elites people felt Pathogenic are the main responsible for causing any kind of health problems. Further, 14% low 21.% middle class 21% higher class and 11% elites

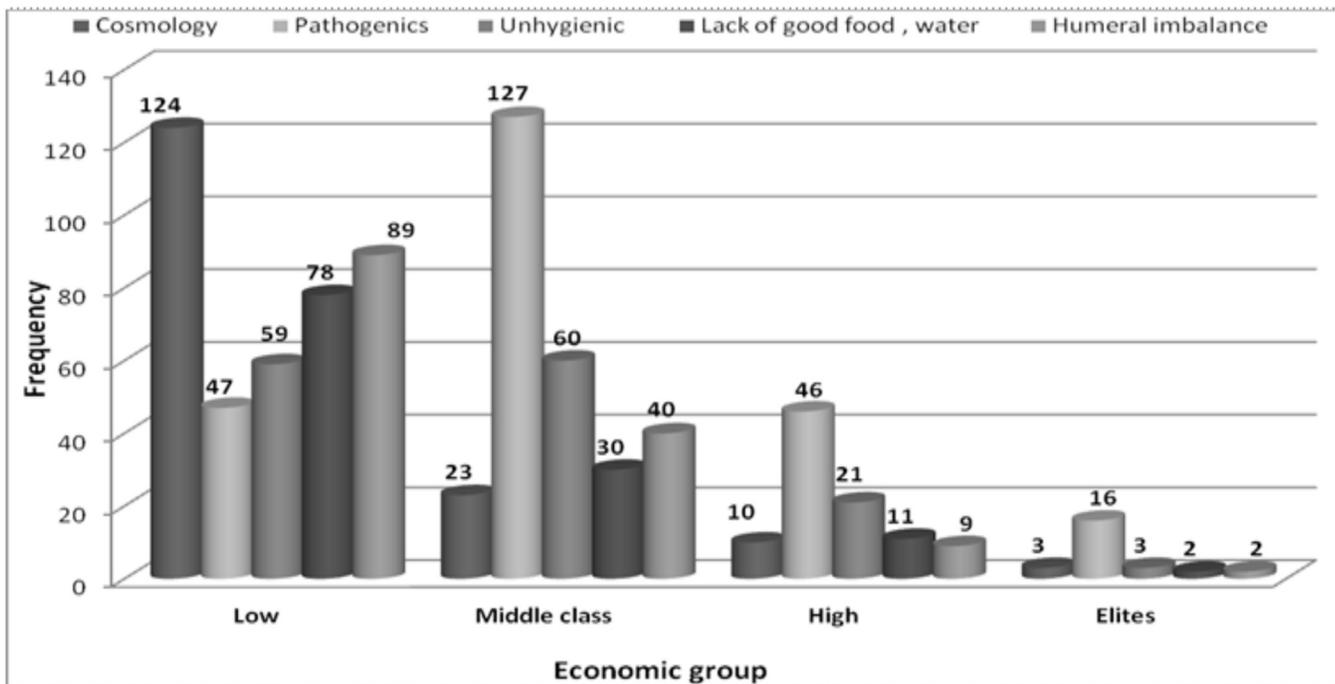


Fig. 1: Opinion about Influences of Socio-Economic Status on Health Seeking Behavior of the Respondents

felt Unhygienic conditions in the rural parts are the main responsible for causing any type of health problems. Subsequently 22% low 14.% middle class 9% higher class and 7% elites felt are the Humeral imbalance is the main responsible for causing various health problems (Fig 1)

Regarding factors determining different treatment patterns of the respondents 18% of them alleged income and occupation 22% said education 50% opined gender and 23% of the respondents felt social network influences in opting western type of western medicines. Next, 25% of the respondents felt income and occupation 15% of them said education 13% of them said gender 11% said social network influences in opting folk medicine. Next, 9% of them said income and occupation 12% of them said education 9% said gender 16% of them said social network influences in opting Ayurvedic system. Subsequently 9% said income and occupation 12% said education 9% said gender 16% said social network influences in opting Homeopathy health cares system (Tab-4). In case of economic group wise opinion about medical pluralism it is found that 51% of low income group 32% of medium 25% if high and 30% elites opined medical pluralism is more useful to the poor patients. However, 14% of low income group 19% of medium 24% if high and 23% elites opined medical pluralism gives more options to the poor. Next, 19% of low income group 23% of medium 10% if high and 19% elites opined rate of success of healing will be more in case of

medical pluralisms. However, 2% of low income group 3% of medium ,2% of high and 3.8% elites opined medical pluralisms crates more confusion to the patients (Tab-5).

Regarding uncovered determining factors on health seeking behavior patterns of the respondent it is found that 35% said Social Support Networks 18% felt Social Environments 25% felt Physical Environments 8% felt Personal Health Practices And 41% felt Quality of Health care Services in opting western healthcare. Further, 35% said Social Support Networks 28% felt Social Environments 37% felt Physical Environments 26% felt Personal Health Practices And 43% felt Quality of Health care Services in opting folk medicine. Further, 10% said Social Support Networks 17.8% felt Social Environments 11% felt Physical Environments 7% felt Personal Health Practices And 17% felt Quality of Health care Services in opting over the counter system. Next, 4% said Social Support Networks 2.8% felt Social Environments 1.4% felt Physical Environments 2.3% felt Personal Health Practices And 1.5 % felt Quality of Health care Services in opting faith healers to cure their health issues (Tab-6).

DISCUSSION

Health is an inevitable aspect of in any bodies’ life. Today levels of education are rapidly increasing in rural areas. Like other studies this study has also found level of education also significantly affects on the health status of any community.^[5] This study has also showed

that as educational level increases, awareness about various health issues are also increases. Hence people are escaping from various diseases. Regarding occupational status, the majority of them are working in primary sector followed by secondary and tertiary sector. This study has revealed that respondents' having a good occupation can get more income and they can have more improvised health behavior, consistent income also plays a vital role in having a quality healthy life. Also occupational status has a closer link in accessing the modern health care facilities. This study also proved that more the better occupational status, is lesser to be exposed to the various occupational related disorders.^[6]

Every culture evolves its own classification and structure of medicine in order to treat diseases in its own way. Thus, treatment of the diseases may differ among various social groups. To comprehend health and health-related problems in an accurate viewpoint, it is extremely significant to think the socio-cultural factors surrounding the health issues. This is an extra relevant factor in the rural areas. Studies conducted on sociology of health and illness in India has used an existing social structure as the basic unit for the reference. Caste and class will play few specific roles and in rural area some time people belonging to the higher caste will be the power centric and even they can control the money flow. Even though the western medical system has an edge over the traditional once, its success depends on how good it gets a reliable space "between the realm of outsider and the inner realm of kinship".^[7]

A factor affecting in the selection of treatment pattern it is revealed that 18% opined it is income 22% opined it is education, 50% opined it is occupation and 23% it is a social network which affects a lot in selecting western medical care system as first choice. Further, 25% with respect to income and occupation, 15% with respect to education, 13% with respect to gender and 11% with respect to social network is largely affected while selecting folk medicine as a first choice. It shows respondents' having good occupation, education and social network normally opt modern health care facilities. Gender discrimination is more while opting modern healthcare facility.

Regarding the economic GroupWise opinion about causing illness and diseases respondents belonging to a low economic group opined cosmology and humeral imbalance causes diseases whereas middle class respondents opined that pathogenic agents and unhygienic conditions causes illness and diseases.

Further, high economic group and elites opined pathogenic agents basically cause various health problems. It shows as level of economic status improves more health education, awareness and attitude can be seen whereas low economic group respondents' still believe traditional theories of health and illness. Regarding caste wise opinion SC and ST community strongly believe humeral and super natural causation of illness and diseases. However notable percentages of them opined pathogenic and unhygienic conditions causes health problem. It shows gradually they are keep changing their health seeking behavior.^[8]

Different economic groups have expressed interesting feature about medical pluralism. Low economic respondents felt medical pluralism may give an opportunity for the poor patients because of the cost factor. The majority of the respondents opined medical pluralism will leave more success rate of healing. However all respondents opined medical pluralism has quality problem and fake practitioners in rural parts. Respondents opined in rural area patients are being cheated in the name of medical pluralism. Also noted percentage of them opined medical pluralism may lead a kind of confusion among the patients'. Level of education and preventive measure has close association. Illiterates still stick on to the traditional concept of preventive care. Still they believe worshiping deity/cosmology to solve their health problems.^[8] However gradual change also can be seen in their overall attitude due to various external efforts. It is found that as the level of education increases more inclination towards the modern etiology can be noticed. Also it is noted that the level of education has not done much impact among few respondents yet. Surprisingly few respondents' having higher level of education still believes in the deity/cosmology theory to keep healthy. External interventions has some impact on the less educated respondents to believe the role of immunizations and health education in keeping healthy.

Caste and religion have close similar/dissimilar associations in using specific/different kind of medical system in rural settings. Also few studies have shown religion has no connection with using a specific type of medical system. It is opined that Unani system is quite universal in Kerala, while people belongs to another religion in UP and other states are sparingly use Unani in all walks of life. Sidda system is relatively rare among Muslims and christen where it is quite common in the case of low caste Hindus especially among tribal people Faith healing is common with

Hindu's and Muslims and most uncommon among the Spelling. It raises some important question regarding the relationship between religious background and usages of specific type of medicine available in the society. Ayurvedic is one of the oldest systems and it is more prevalent among all the religions. It is further opined in some part of the world people would like to differentiate between religion and medicine based on the procedure involved in curing sessions. Otherwise any identification of any type of medical system would lead to the communal issue.^[8]

It is also found that caste and medicine relationship especially in post industrial society is a significant sociological issue. Certain castes in rural area have dominated on traditional medicines. It has become a family business. Also it is found that certain traditional healers would like to extend the treatment only for the patients belonging to his/her community only. It is felt in British regime traditional medicinal system was an important tool for the caste mobilization. This study found that caste comparison and caste based treatment have been plagued in traditional medicine system in rural parts of the country today. It is also found, because of caste and class conflicts and medicalizations, socially excluded communities are suffering a lot in rural parts of the country. Sentence is not appropriate

Sociologists from the long back are showing interest in studying between Lot of grammatical mistakes different segmentation of the society and emerging medicines. Also sociologists are doing some comparative studies between medical pluralism among various castes and ethnicity also a strong indicator/parameter in evaluating health inequalities. It is revealed that each and every caste in India has its own health culture, tradition, ritual, diet in a given society. Also it is noted in a multi caste society health culture and health seeking behaviors varies significantly under the changing social system due to various external factors. Lower caste people mostly prefer only traditional medical care for any health problems while higher caste people will opt quality medicinal care.

Suggestions :

- * Culturally sensitive and situated understanding of health seeking behaviour may improve treatment compliance and shorten delay to diagnosis
- * Multiple health seeking should be recognized and incorporated into a wider co-ordination across the health system, with better co-operation between public and private providers

- * Some of the communicable diseases which are most commonly prevalent among the rurals including malaria, cholera, diarrhea, malnutrition, et require good health education grass root level interventions and hygienic environment.

CONCLUSION

In India where rural people were significantly altered socially and culturally by the British colonization it is crucial and important to understand social and cultural consequences of colonization and how these have altered the health culture and the health behavior of the rural respondents' historically and currently. It is found that found that cultural heterogeneity has the strongest influence on the health culture and health behavior of the rural respondents' than religion. This study has found that regional specific cultural health model may be presented in a culturally, linguistically and regionally appropriate format may be useful to the policy makers in introducing modern health care facilities rigorously and socio economic issue a play a vital role. Rural areas will be normally predominated by the different marginalized social and cultural groups. These groups are living with other major cultural groups i.e living with other major cultural influence and surrounding beliefs about health may account for liking or disliking modern healthcare system. Govt. should take measures to decrease socio-economic disparities.

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BEYOND ESTHETICS - ROLE OF ORTHODONTICS IN REHABILITATION OF A PERIODONTALLY COMPROMISED ADULT

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ABSTRACT

The case report signifies the role of orthodontics not merely in the esthetic purview but also in the area of oral healthcare. The importance of synergistic orchestration among dental specialties in oral rehabilitation has been highlighted, thus improving

the quality of life in periodontally compromised patients.

Keywords: Periodontally-compromised, adult-orthodontics, rehabilitation

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INTRODUCTION

Orthodontics is often considered to be simply an esthetic domain and the orthodontic standpoint is often omitted from treatment planning in cases of periodontic - prosthodontic collaboration. The demographics of the orthodontic patient has changed with more adult patients actively seeking orthodontic treatment either to improve esthetics, function or facilitate the restoration, replacement or stabilization of teeth. A good number of these might be periodontally compromised.

The effect of orthodontic treatment on periodontal health has evoked mixed responses.^[1-4] While orthodontic appliances have been accused of causing gingival inflammation due to promotion of plaque harboring areas, this effect is reversible when the appliances are removed. The most common orthodontic problems found in a periodontally compromised patient include proclination of anterior teeth, irregular interdental spacing, rotation, over eruption, migration, loss of teeth or traumatic occlusion.^[5] In all the aforesaid situations, orthodontic treatment may contribute significantly to aesthetic and functional rehabilitation of the stomatognathic system.

This article portrays one such case signifying the role of orthodontic treatment not merely in the sphere of esthetics but also in the field of oral healthcare.

CASE REPORT

A 26-year old male patient presented with complaints of unaesthetic appearance due to proclined & spaced front teeth and reduced masticatory efficiency

due to loss of few posterior teeth. He was diagnosed previously with localized juvenile periodontitis and had extractions of 15, 16, 36 and 46, two years back due to mobility. A full mouth periodontal surgery had been carried out for the same and he also reported a familial history of similar conditions and treatment.

Extraorally the patient presented with acute nasolabial angle, incompetent lips and lip trap. Intra

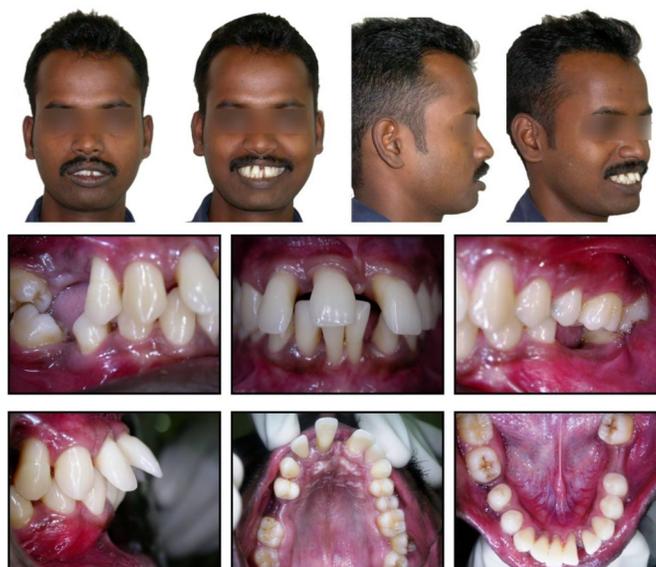


Fig. 1 Pretreatment photographs

oral features included missing 15, 16, 36 and 46, proclination & spacing of maxillary anteriors, proclination of mandibular anteriors, migration of 37, 45 and 47, deep bite and high frenal attachment in maxillary arch (Fig. 1).

Periodontal examination revealed Class I gingival recession in relation to 11, 12, 21 and 42, Class II recession in relation to 31 & 41; Grade I mobility of 11, 12, 41 and 42. OPT reveals missing 15, 16, 36, 38 and 46, mesially tipped 17, 37, 47 and 48 (Fig. 2a). Lateral cephalometric analyses showed a Class I skeletal base with orthognathic jaws, horizontal growth

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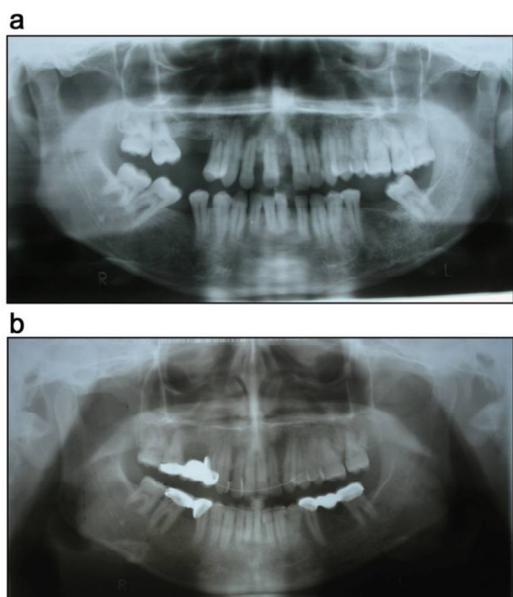


Fig. 2 Pre (a) and post (b) treatment OPTs
 pattern, incompetent lips, acute nasolabial angle, proclined maxillary and mandibular anteriors (Fig. 3a).

Treatment Progress:

The periodontal condition was co-evaluated by the Department of Periodontology. Professional cleaning and examination of periodontal tissues were performed. The patient was instructed to practice sound oral hygiene by brushing and use of mouthwash twice a day. The patient was also informed about the potential risks of noncompliance.

Orthodontic treatment was started using a 0.022" x 0.028" Roth prescription pre-adjusted edgewise appliance. Intrusion of upper incisors, space closure in upper and lower anterior region and uprighting of lower second molars were the other objectives of orthodontic treatment and the duration of treatment was 23 months.

During the course of treatment, patient experienced pain in relation to 14. The patient was referred for

management. An angular defect in 14 was detected and was treated for the same with flap surgery and grafting. An opinion was sought from the Periodontist regarding the gingival contours in relation to 11 and 12. Due to attachment loss and papillary recession surgical treatment was not advised for gingival contour correction. Frenectomy was performed in both the arches.

Prosthetic rehabilitation involved replacement of missing 16, 36 and 46 with fixed partial dentures. The entire treatment was completed in 27 months and at the end of treatment upper and lower lingual bonded retainers were delivered. Three years post treatment, the results were found to be stable (Fig. 4).

DISCUSSION

As early as 1923, Dr. Isador Hirschfeld, a periodontist, reported that the position of the teeth in

Table 1 : Probing depths

Tooth No.	12		11		21		22	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
MsB	3.5	3	3.5	3	3.5	2	3.5	2
MdB	1	1	1	1	0.5	1	1	1
DsB	3.5	3	3.5	3	3.5	2	3.5	2
MsL	3.5	3	5.5	2	5.5	2	2.5	2
MdL	3.5	2	3.5	2	1	1	2	2
DsL	5.5	3	5.5	2	0.5	1	0.5	1

their spatial relation to the alveolar process can have an effect on the shape and location of the periodontium.^[6] In the 1950s it was hypothesized that

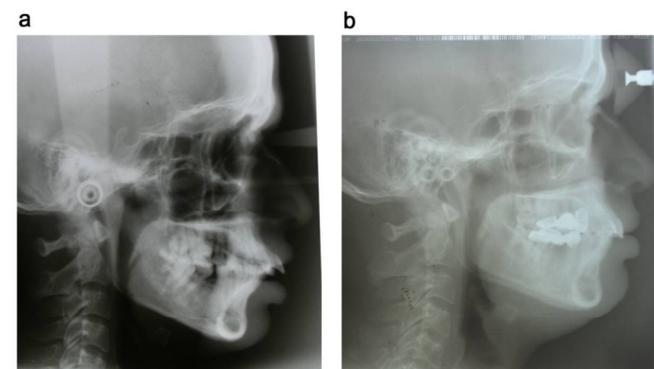


Fig. 3 Pre (a) and post (b) treatment lateral cephalograms



Fig.4 Three years post treatment extra- and intraoral photographs revealing stable results

the abnormal, nonphysiologic topography of the periodontium could be changed by altering the alignment of the roots.

Further in cases where there is trauma from occlusion due to deep bite and occlusal prematurities, orthodontics can actually benefit the periodontal health.

In our patient where the teeth were splayed and contacts were open, approximation of teeth not merely improved dental esthetics but also improved gingival esthetics by regaining the lost papilla in open gingival embrasures. Further, gingival health was improved by regaining attached gingiva by intrusion of teeth. Leveling and aligning of teeth improved bone levels as evident from the post treatment radiographs. This was also clinically evident by the improvement in probing depths (Table 1). Orthodontic uprighting is accompanied by the elimination of osseous defects and improvement in crown-root ratio.^[7] The latter and more normal angulation of the teeth would be favourable for prosthodontic loading. Although technically the mesial tipping produces only a gingival or pseudopocket with no loss of periodontal attachment, a pocket deeper than 3 mm produces microecosystems that promote the growth of pathogens and subsequent attachment loss.^[8] In this patient there was a reduction of mesial periodontal defects by uprighting the mesially inclined molars eliminating chances of attachment loss. In addition, opening the bite eliminated the trauma from occlusion preventing further deterioration of the periodontal health.

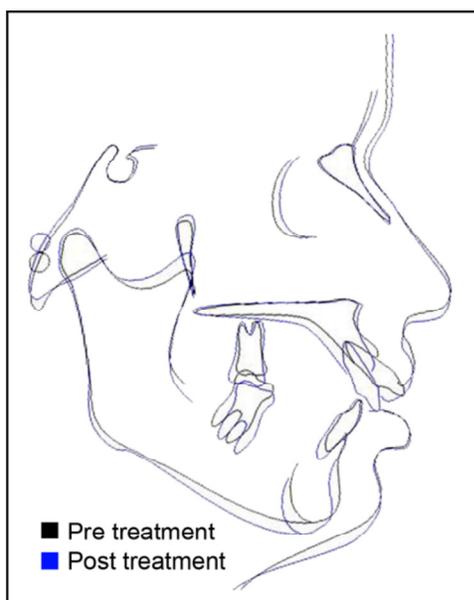


Fig. 5 Superimposition of pre- and post treatment lateral cephalograms

Permanent retention was advocated for this patient which is indispensable in patients with significantly reduced periodontal support.^[9] Removable retainers should be avoided, because they can exert forces that cause uncontrollable jiggling to the teeth with unpredictable consequences on the periodontal tissues.^[10]

Highly esthetic and functional results were achieved by treatment with orthodontics, periodontal therapy and prosthetic rehabilitation. Thus with this synergistic orchestration between the specialties, not merely was the esthetics improved, but the prosthetic foundation was more stable and most notably, the periodontal health was maintained and unnecessary removal of alveolar bone was avoided as pathologic contours due to mal-aligned teeth were eliminated prior to osseous surgery. Figures 2b and 3b show progress films taken 3 years post treatment. Superimposition of pre- and post treatment cephalograms (Fig. 5) demonstrates significant improvement after treatment.

CONCLUSION

Patients with a compromised periodontal condition and a breakdown in occlusal support may require periodontal and prosthodontic treatment in conjunction with orthodontic treatment. Orthodontic treatment of these patients would involve removal of inflammation and occlusal interference and provision of an environment for proper restorative rehabilitation. The final treatment plan, thus individualized and tailored to meet the needs, objectives and expectations of the patient, would distinctly improve the quality of life.

ACKNOWLEDGEMENTS

Department of Periodontology, Department of Prosthodontics & Implantology, Faculty of Dental Sciences, SRU

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TURNER SYNDROME WITH MOSAIC 45, X (77%)/46, XR (X) (23%), (TURNER MOSAIC WITH RING X CHROMOSOME): A CASE REPORT

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ABSTRACT

Turner syndrome (TS), a sex chromosomal aneuploidy with 45,X karyotype, is a common chromosomal disorder encountered in pediatric practice which is due to loss of part or all of an X chromosome. This is one of the common causes for growth retardation in a girl child and also a cause for amenorrhea in adolescent girls.

Majority of children with TS used to have a 45,X cytogenetic picture, few children may have a structural abnormality of the second X chromosome.^[1] Rearranged X chromosome in TS is generally well tolerated but in cases of ring X chromosome, a rare cytogenetic abnormality, the incidence of associated phenotypic abnormalities may be subtle so much so a routine

karyological investigation is mandatory for a firm clinical diagnosis.

We are presenting a case of a 12 years old girl with growth retardation and subtle dysmorphic phenotype. After ruling out the non genetic cause for short stature with dysmorphism, the cytogenetic study reported as Turner Syndrome with Mosaic 45, X (77%)/46, Xr (x) (23%). Turner mosaic with ring X chromosome is presented for its rarity, the significance of karyological study and its clinical correlation is discussed in this paper.

Keywords: Mosaic, Ring chromosome, Turner's syndrome.

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INTRODUCTION

Turner Syndrome affects approximately 1 out of every 2,500 female live births globally with a broad spectrum of features, from major heart defects to minor cosmetic issues.⁽¹⁾ The true prevalence of Turner syndrome in Indian scenario is difficult to ascertain, the reasons being the unaffordability and scarcity of cytogenetic laboratory and undiagnosed cases of mosaics with mild phenotypic features.

The severity of clinical features varies from mild to severe depending upon the chromosomal pattern, hence the necessity for a basic cytogenetic work-up which is essential for counselling these children with Turner Syndrome. Ours is a case of Turner Syndrome with Mosaic 45, X(77%)/46, Xr (x) (23%) and this case is presented because of the rarity of mosaic with ring X chromosome.

CASE REPORT :

A 12 years old girl, 2nd born of a nonconsanguineous parents, born full term with appropriate developmental milestones was referred for evaluation of growth faltering. Her elder brother 17 years old is normal for his age. There was no history

suggestive of chronic respiratory, gastrointestinal, renal or cardiac illness. Her scholastic performance was below average. Anthropometry showed a weight of 30 kg and height of 123 cm, which was less than 3rd percentile with normal head circumference. Her Body Mass Index (BMI) was 13.8, Sexual Maturity Rating staging - 1, upper segment 62cm, lower segment 61cm and arm span 120cm. Her father's height was 166cm, mother's height was 156cm, mid parental height was 154cm and her projected height at 18 years was 144cm. Systemic examination was normal.

Head to toe examination revealed a short statured girl with subtle dysmorphic features in the form of short neck and a low posterior hairline. Thoracic cage was normal in shape with widely placed nipples. The fingers were short and stubby. Spine and cranium were normal.

With the above clinical findings a working diagnosis of, "A short girl child with subtle dysmorphism and poor scholastic performance" was considered.

Ultrasonogram (USG) abdomen showed infantile uterus of size 3.5cm with tiny ovaries. X-Ray of left elbow showed delayed bone age. The finding of infantile uterus and delayed bone age in a short girl child grew the suspicion of a chromosomal disorder hence blood sample for karyological study was done. G-Banded chromosomal analysis of cultured peripheral blood leucocytes revealed "Turner Syndrome with Mosaic 45, X (77%)/46, Xr (x) (23%)". (Fig.1)

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Fig.1: G banded karyotype depicting ring X chromosome.

DISCUSSION

There are few clinical conditions where karyological study is a gold standard for making a firm clinical diagnosis. The karyotype in our case showed 77% of the cells showing absence of one X chromosome (45, X), the remaining 23% a ring chromosome 46,X, r(X).

Mosaicism with a normal cell line in the fetal membranes may be necessary in all affected cases for adequate placental function and fetal survival.^[2,3,4] A ring chromosome is a chromosome whose arms have fused together to form a ring. Ring chromosomes were first discovered by Lilian Vaughan Morgan in 1926.^[5] Ring chromosomes may form in cells following genetic damage by mutagens like radiation, also arise spontaneously during development. Disorders arising from the formation of a ring chromosome include ring chromosome 20 syndrome where a ring formed by one copy of chromosome 20 is associated with epilepsy; ring chromosome 14 and ring chromosome 13 syndrome are associated with mental retardation and dysmorphic facial features; ring chromosome 15 is associated with mental retardation, dwarfism and microcephaly.^[6] Ring formation of an X-chromosome causes Turner syndrome. Symptoms seen in patients carrying ring chromosomes are more likely to be caused by the deletion of genes in the telomeric regions of affected chromosomes, rather than by the formation of a ring structure itself.

A review of previously published cases of ring chromosome X revealed all of them having mosaicism with major cell line being 45, X. All have short stature.

Some are sexually developed and fertile.^[7] This phenotypic variation may have at least two causes: the size of the deleted portion at each end of the X chromosome, and the relative frequency and distribution of 45,X and 46,X,r(X) cell lines in various body tissues.

Eventhough karyological study is a cumbersome and expensive investigation for the diagnosis of Turner syndrome it is mandatory in order to make a firm diagnosis and to offer treatment like growth hormone for short stature and hormonal replacement to improve the secondary sexual characters.

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MALIGNANT PERIPHERAL NERVE SHEATH TUMOUR IN NEUROFIBROMATOSIS TYPE - 1

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INTRODUCTION

Malignant peripheral nerve sheath tumours (MPNST) are soft tissue tumours arising from peripheral nerves.^[1] While they can be spontaneous in origin, 5-42% are associated with neurofibromatosis (NF) type-1.^[2] NF-1 is a genetic disorder the hallmarks of which include cutaneous manifestations such as café-au-lait spots, skeletal dysplasia and tumours involving the nervous system (both benign and malignant).



Fig 1: Café-au-lait spots

A 36-year-old-man presented with complaints of pain and swelling over the posterior aspect of his right thigh. On examination he was found to have a 3x8cm swelling over the posterior aspect of his right thigh. He was also found to have multiple café-au-lait spots (Fig. 1) and neurofibromas (Fig.2). Café-au-lait spots indicate the common origin of melanocytes with neuroectodermal cells from the neural crest. The mother had similar lesions. Slit lamp examination revealed Lisch nodules over the iris (Fig.3). Diagnosis of Neurofibromatosis type-1 was made and he underwent excision biopsy of the swelling, which revealed a well encapsulated tumour over the sciatic nerve as seen in Fig. 4. Histopathological evaluation showed spindle cells

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Fig 2: Multiple neurofibromas

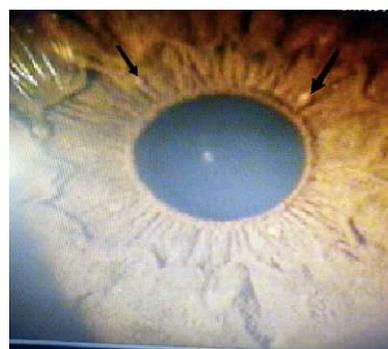


Fig 3: Lisch nodules

that stained positive for S-100, indicating neural origin. The following criteria were used to confirm the diagnosis of MPNST^[3]: 1) tumour in relation to a peripheral nerve, 2) presence of neurofibromas, 3) microscopic features of spindle cells with mitosis (fig 5.3) and/ or necrosis and 4) cells that stain positive for S-100 (Fig. 5.1)



Fig 4: Encapsulated tumour seen over the sciatic nerve.

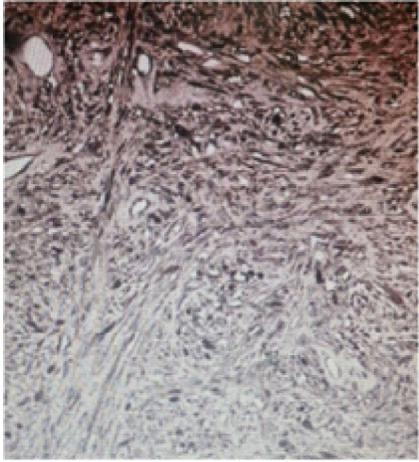


Fig 5.1: S-100 stain positive



Fig 5.2: Smooth muscle around blood vessel staining positive for VIMENTIN

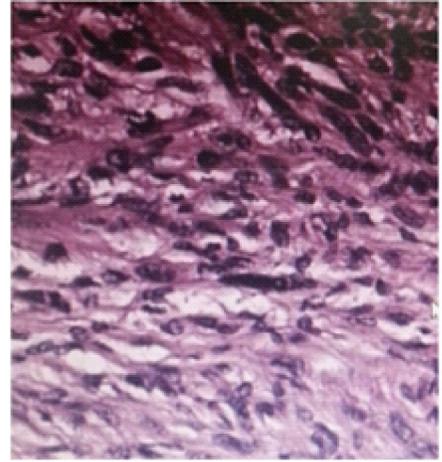


Fig 5.3: Atypical mitosis

DISCUSSION

Neurofibromatosis type-1 or Von Recklinghausen's Disease is a genetic disorder with a multisystem involvement. One of the manifestations is plexiform neurofibromas that have a 2-5% chance of turning into malignant peripheral nerve sheath tumours.^[4] MPNSTs usually present as a gradually enlarging mass that may or may not be associated with pain. Surgery is the definitive mode of treatment with adjuvant chemotherapy and radiotherapy. Considered an aggressive tumour, they are associated with a high rate of both local and distant metastasis.

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ABOUT GRANTS IN INDIA

As anywhere in the world, majority of the funding for research in India comes through the government. Much of the funding for life science research is channeled through the Central Government's Department of Science and Technology-DST and the Department of Biotechnology-DBT. Both DBT as well as DST, have various extramural funding schemes. Other agencies that fund extramural grants include Department of scientific and Industrial research- DSIR, Department of Atomic Energy- DAE, Department of Ocean Development and Earth Sciences and Department of space – to name a few. Apart from these, life science sectors are also funded by Department of Agriculture through the Indian Council for Agricultural Research - ICAR and the Indian Council for Medical Research that falls under the auspices of Department of Health Research.

The list of funding agencies are given below:

1. Life science research (any area), though plant tissue Culture, grafting, breeding etc might fall under ICAR
DBT: <http://dbtindia.nic.in/index.asp>
2. Any branch of science
DST: <http://www.dst.gov.in/>
Tamil Nadu State council for Science and Technology- www.tanscst.nic.in
3. Biomedical research
ICMR: <http://www.icmr.nic.in/>
4. Through Human Resource Development Group (HRDG), it funds various extramural grants with focus on scientific applications
CSIR: http://rdpp.csir.res.in/csir_acsir/Home.aspx
ICAR: <http://www.icar.org.in/>
5. Plant, animal science, horticulture based research areas
Ministry of Earth Sciences – funds research in marine biology, oceanography, geophysics among others
MoES: <http://dod.nic.in/>
Ministry of Environment and Forests Extramural funding for ecology projects, including conservation, environmental impact studies, taxonomy, and wildlife management
MoEF: <http://moef.nic.in/index.php>
6. Clinical research in ISM- Ayurveda, siddha, Unani and Homeopathy : AYUSH
www.ccras.nic.in
www.ccrum.net
www.ccrhindia.org
www.ccryn.org
7. Defense Oriented projects
www.drdo.gov.in/lsrc
8. Projects related to marine research
www.niot.res.in
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The Sri Ramachandra Journal of Medicine - a scientific journal, publishes contributions in medical and allied health sciences. The scope of the journal allows publication of :

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Presentation of manuscripts should conform with the uniform requirements for manuscripts submitted to biomedical journals [<http://www.icmje.org>]. Manuscripts should be submitted as per the instructions given below. Failure to follow these instructions may result in the manuscript being returned to the author(s) for revision. The manuscripts submitted to the Journal is considered not submitted elsewhere nor under consideration for publication in other Journals.

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- All contents related to manuscript submission should be in English on a White paper of A4 size with margins of 25mm (1 inch) width on all the four sides.
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- Three paper copies should be submitted to the editor.
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- Pictures having visible identity of patients should be accompanied by a duly signed patients consent form.

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Authorship credit should be based only on substantial contributions

- 1) to conception and design or acquisition of data or analysis and interpretation of data;

- 2) drafting the article or revising it critically for important intellectual content; and
 - 3) final approval of the version to be published.
- Conditions 1, 2 and 3 must all be met

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Articles of original research are welcome in this category. Articles should not exceed 4000 words. It must include an abstract of 250 words. Minimum of three MeSH words to be mentioned at the bottom of the abstract. Upto 50 references may be included in these articles. The manuscript should be prepared as title page, abstract and keywords, introduction, materials and methods, statistical analysis, results, discussion, acknowledgement, references, tables and figures. Each of the above mentioned should begin in a fresh page.

I. TITLE PAGE: List

- (i) title of the manuscript
- (ii) the initials followed by the name of each author and highest academic qualification;
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The authors are strictly advised not to mention their name and affiliation details in any of the subsequent pages other than the Title page since it may interfere with the review process.

II. ABSTRACT AND KEY WORDS: The second page should carry a structured abstract of not more than 250 words with subheadings of

- (i) Background and objectives,
- (ii) Methods,
- (iii) Results and
- (iv) Conclusions

It should be written for the readership of both clinicians and basic investigators and should state the hypothesis or central question of the study or investigation, the study subjects or experimental animals, observational and analytical methods, the main findings, and a final statement of the principal conclusions. Three to six key words using, where possible terms of medical subjects headings list from Index Medicus [MeSH].

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IV. MATERIAL AND METHODS. The material (patients, laboratory tests, experimental animals, etc.) used for making observations must be described along with all other relevant information. The methods used in the study should be described,

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STATISTICAL METHODS:

The relevant statistical methods used for analysis should be briefly explained mentioning the objective of each statistical test in relation to the variables in the reported study that is meaningful. When 'p' value is mentioned the exact number should be mentioned [exception is a highly significant value which may be mentioned as <0.001]. Mention should be made about the predetermined level of 'p' value which will be considered significant. Details of the statistical software used and its version needs mention.

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Tian D, Araki H, Stahl E, Bergelson J, Kreitman M. Signature of balancing selection in Arabidopsis. *Proc Natl Acad Sci USA*. In press 2002.

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Borkowski MM. Infant sleep and feeding: a telephone survey of Hispanic Americans [dissertation]. Mount Pleasant (MI): Central Michigan University; 2002

6. ELECTRONIC MATERIAL:

Dengue haemorrhagic fever: diagnosis, treatment, prevention and control. 2nd edition. Geneva : World Health Organization. available at: <http://www.who.int/csr/resources/publications/dengue/Denguepublication/en/>

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Correctness of the reference list is the entire responsibility of the author (s).

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- (i) Glossy print photographs (in triplicate) are required (usually 10 cm × 8 cm); good contrast is essential for good reproduction.
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- (iii) Figures should be labeled appropriately using arrows [black, white, single or double] which should be mentioned and explained in the legend.
- (iv) All Figures must be numbered and cited in the text.
- (v) Legends should be provided for each figure, listed on a separate page.
- (vi) Figures reproduced from previously published journal articles, textbooks or websites should accompany details of permission obtained from the respective copyright owner.

TABLES:

- (i) Each table should be typed double-spaced on a separate sheet.
- (ii) The total number of tables should be not more than 3.
- (iii) They should have an underlined title followed by a legend, if any.
- (iv) Explanatory matter should be in a footnote, not in the title. The symbols *, †, ‡, §, ||, ¶, **, ††, ‡‡ can be used in the table or its foot note..

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Articles addressing an theme of current interest is welcome in this category. Articles should not exceed 4000 words. The manuscript should be prepared as title page, abstract and keywords,

introduction followed by discussion, acknowledgement, reference, tables and figures. Each of the above mentioned should begin in a fresh page

I. ABSTRACT AND KEYWORDS:

- (i) In an unstructured format not more than 250 words.
- (ii) It should describe the background and summary of the discussion related to the topic of interest.
- (iii) Minimum of three Mesh words to be mentioned at the bottom of the abstract. Upto 50 references may be included in these articles.

II. INTRODUCTION: It should commence on separate page and should briefly explain the reason for the review. This should be a brief overview about what is already known on the topic of the article. This should be followed by a statement on the method of review of literature. A systematic explanation of the methods followed to search the literature on the topic of interest is desirable.

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Title page, acknowledgement, references, tables and figures should be prepared as per instructions already mentioned under guidelines for original article.

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Properly analyzed cases reflecting important clinical problems that contribute to the understanding of pathogenesis, diagnosis and management of a condition are welcome for this section. Manuscripts discussing more than one case will be given preference. The manuscript should not exceed 750 words with no more than 2 tables/ 3 figures and 10 references. The manuscript should be arranged as title page, abstract, Introduction, description of the case and discussion, acknowledgements, references, tables and figures.

ABSTRACT: It should be no more than 200 words. It should highlight the clinical importance and salient features of the case. 3 Mesh words should be provided.

INTRODUCTION: A brief mention about the background literature related to the case discussed. This should focus on epidemiology and clinical relevance of the case.

DESCRIPTION OF THE CASE AND DISCUSSION: The case should be narrated in a simple and logical manner with important observations shown as tables and figures [the latter two should be kept at the end of the manuscript as described earlier]. Discussion should focus on similar or related case reports published in the global literature and important or unusual features in the case described.

Title page, acknowledgement, references, tables and figures should be prepared similar to instructions already mentioned.

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Thoughtful discussions of current topics are welcome in this category. Should be no more than 500-1000 words, no tables or figures and references to a maximum of 10. The manuscript should be prepared as title page, abstract of 150 words with 3 Mesh terms, text of the manuscript which may be self styled followed by references

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Summary of recent advances in health sciences and education are welcome in this category. Should be no more than 500-1000 words, not more than 2 tables/2 figures and no more than 10 references. The manuscript should be prepared as title page, abstract of 150 words with 3 Mesh terms, text of the manuscript which may be self styled followed by references

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