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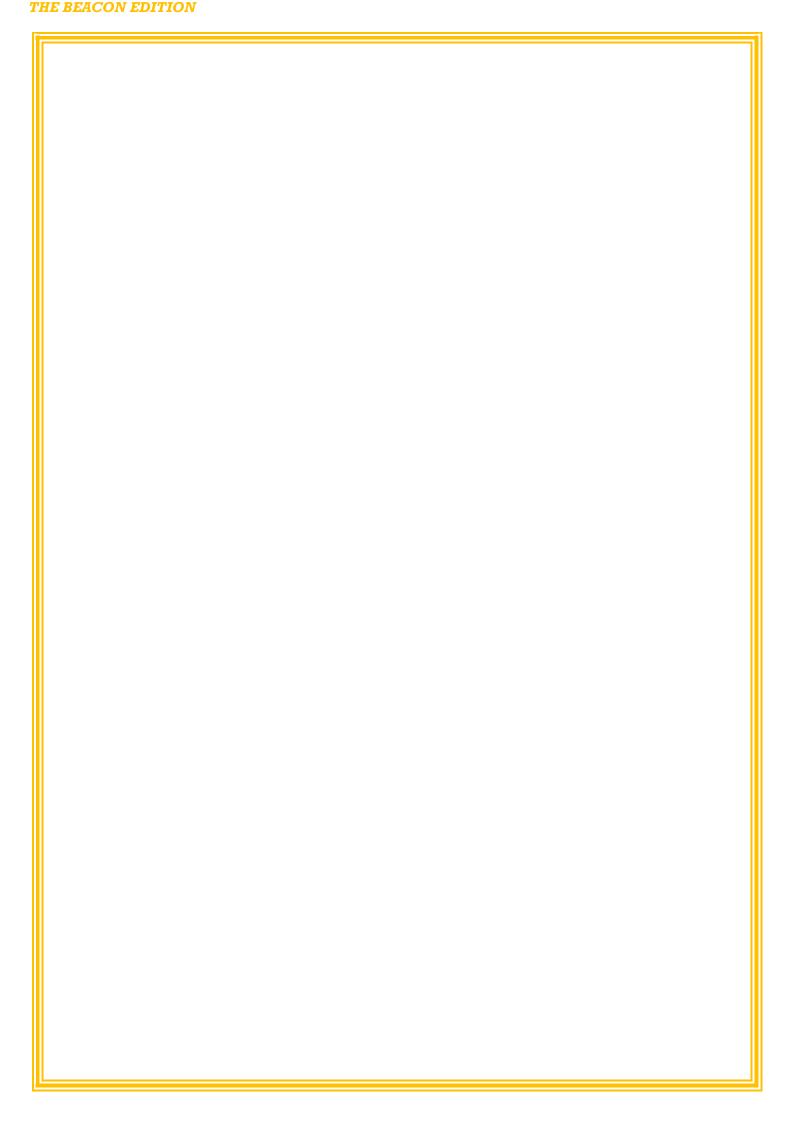


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Abstract:

NEUROPROTECTIVE EFFECT OF AMLA EXTRACT ON DNA FRAGMENTATION IN CEREBRAL STROKE IN RATS

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This study was done to determine the neuroprotective effect

of amla fruit extract on DNA fragmentation after ischemia reperfusion injury in rats. The MCA of male SD rats were occluded for 60 minutes with the use of an intraluminal technique, and reperfusion was instituted for 24 hours. Amla extract was administered orally 1 hr prior and 3 hours post to ischemia reperfusion injury.DNA fragmentation was measured by performing terminal deoxynucleotidyl transferase-mediated dUTP nick end-labeling (TUNEL) assay. With amla extract treatment, the number of TUNEL positive cells in the ipsilateral cerebral cortex and striatum region was significantly reduced at 24 hours after reperfusion. In summary, our data suggest that inhibition of apoptosis with amla extract significantly reduces the TUNEL positive cell probably through its antioxidant and antiinflammatory property.

Introduction

Amla is a well know herbal medicine containing flavonoids with many biological action. Stress and family burden are the major cause of stroke in developing countries^{1,2}. Several studies demonstrated that reactive oxygen species, cytokines and platelet activations cause neuronal damage in cerebral stroke^{3,4}.Uncontrolled cell death play a major role for neurotrophil growth factor in neuronal cell survival⁵. Mitochondria and ribosomes aggregation, nucleus and cytoplasm condensation are the characteristic features of apoptotic cell death⁶. During cell death process, bio molecules which are responsible for cell growth and development is demolished through proteases activatation

by cascade events. Some studies demonstrated that nucleic acid damage has been observed by two distinguish method in ischemia reperfusion injury – First through nonspecific nucleases ⁷⁻⁹ like proteases or by neuronal nitric oxide synthase 10-14 and second through oxidative stress (at early onset of ischemia) 15,16. Apoptotic cell death is characterised by DNA fragmentation and can be detected by Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) method. The purpose of the present study was to evaluated amla's effect on apoptosis after focal cerebral ischemia in rats.

Material and Methods

Chemicals and kit

TUNEL kit was obtained from Promega, USA.

The standardized lyophilized hydroalcoholic extract of Emblica officinalis (Amla) fruit (HAEEO) was procured from Sanat Products Pvt. Limited, New Delhi, India (A WHOGMP and ISO 9001 Accredited Herbal Extract Company).

Animals

Adult male Sprague-Dawley (SD) rats were procured from the National Laboratory Animal Centre of CDRI, Lucknow, India and experiments were performed only after necessary approval of the Institutional Animal Ethical Committee (No.46/IAEC/2013 dated 23.9.2013).Rats were allowed food and water ad libitum in 12 h light-dark cycle before the experiment.

Animal model

Focal cerebral ischemia was induced by middle cerebral artery occlusion (MCAO) using a modification of the intraluminal technique described by Longa et al 17

Procedure for induction of cerebral ischemia by MCAO

- The rats were examined grossly for any ill health signs.
- Sprague Dawley rats weighing, 260±20 gram were anaesthetized with chloral hydrate (300mg/kg i.p.) and placed in a supine position over a preheated operation table to maintain the body temperature at 37°C±0.5°C.
- The left common carotid artery (CCA) was exposed through the midline incision in the neck region. The neck muscles were separated further to expose external carotid artery (ECA) and internal carotid artery (ICA).
- A curved micro vascular clip was placed across the CCA adjacent to the ECA origin and a silk suture knot was tied loosely close to the bifurcation of ICA.
- A (3-0) nylon monofilament suture (Ethicon, Johnsons & Johnsons Ltd, Mumbai) was introduced into the ECA lumen through a nick given in the external carotid artery and gently advanced 20-22 mm from the common carotid artery bifurcation till resistance was felt confirming that it has reached the proximal segment of the anterior cerebral artery (ACA).
- The silk suture around ECA stump was tightened together with nylon suture to prevent bleeding and then the micro vascular clip was removed. The intraluminal suture blocked the origin of the MCA, occluding all sources of the blood flow from the ICA, anterior cerebral artery (ACA) and posterior cerebral artery (PCA).
- The suture was pulled back after 1hours of ischemia to reestablish the cerebral blood flow (CBF) and allowed reperfusion for 24hrs.

- In the groups of SHAM operated rats all the surgical procedures were performed except the insertion of the nylon filament.
- The animals were allowed to recover and on regaining the righting reflex and were transferred into cages and placed in a room, and maintained at temperature of 25±0.1°C. Animals were provided food and water *ad libitum* and were closely monitored for any neurobehavioural disturbances.
- Rats showing tremor and seizures were not included in the studies.

Treatment schedule

24 rats were divided into four groups (6 rats in each group). Amla dose was decided from the work of Mahaveer Golechha et al¹⁸.

Group I. Normal control group (SHAM) was given only saline without ischemia reperfusion.

Group II. Animals were given only ischemia reperfusion (I/R) without any treatment.

Group III. Animals were given amla extract (500 mg/k.g.) orally 1 hour prior to ischemia reperfusion.

Group IV. Animals were given amla extract (500 mg/k.g.) orally 3 hours post to ischemia reperfusion.

DNA fragmentation

Rat brains were perfused transcardially with 4% paraformaldehydec for In-situ labeling of fragmented DNA. The terminal deoxynucleotidyl transferase (TdT)-mediated dUTP nick end labeling (TUNEL) assay was employed to detect I/R injury induced DNA fragmentation described by Gavrieli et al⁸. In the present study TUNEL assay (Promega) was performed according to the manufacturer's protocol with slight modifications. Fresh frozen brains were cut into 6.0-8.0 µm thick sections by using cryostat and were processed for the detection and quantification of in situ DNA fragmentation. Briefly, the sections were immersed in 0.85% NaCl for 5 minutes (min) at room temperature (RT) and washed with Phosphate-buffered saline (PBS) (2x5 min). The slides were then immersed in 4% paraformaldehyde prepared in 1XPBS at RT for 15 min and washed with PBS. The all sections including negative controls were then treated with TdT incubation buffer. The reaction was terminated by immersing the slides in 2X SSC for 15 minutes at RT and washed with PBS. Sections were counterstained with 4', 6'-diamino-2-phenylendolehydrochloride (DAPI) as nuclear stain (Santa Cruz biotech). The affected brain regions i.e. striatum and cortex were scanned for DNA fragmentation and cells with fragmented DNA were calculated after averaging the number of cells in at least four non-overlapping microscopic fields per section and the images were superimposed by using IM50 software (Leica, Germany).

Statistical analysis

Data are represent as mean ± standard error of mean (SEM). Student's t-test for unpaired comparison will be used for comparison of two means and comparisons among different groups will be made using the one-way analysis of variance (ANOVA) followed by Newman-Keuls multiple comparison test. A p value of <0.01 and <0.001 was consider as statistically significant.

Results

Effect of amla extract pre and post treatment on DNA fragmentation in striatal region

It was observed that striatal region was greatly affected following I/R injury followed by cortex at respective time point of I/R injury .There were no TUNEL positive cells in any of the two areas on the non-ischemic contralateral side. TUNEL positive cells are significantly increased in the striatum to 38.67 ± 2.02 % as compared to SHAM (Fig,1).TUNEL positive cells significantly (P<0.001) increased in MCAO rats when compared to SHAM at 1/24 hours of I/R in striatum. Similarly, significant increase in TUNEL positive cells was also evident at 1/24 hour of I/R in cortex of MCAO rats as compared to SHAM. The striatum seems to be the most affected region following I/R injury.Further significant increase in the frequency of TUNEL positive cells along with apoptotic features in MCAO compared to SHAM indicate a very significant contribution of apoptosis in ischemic stroke. Apoptotic cell death following I/R injury was significantly (P<0.01) reduced in striatum by Amla pre-treatment (500mg/kg) i.e. 28.33 \pm 1.90% as compared to MCAO i.e. 38.67 \pm 2.02% (Fig.1).The percentage of TUNEL positive cells were also significantly (P<0.01) decreased in striatum with amla post treatment (31.17 \pm 2.04%) as compared to MCAO (38.67 \pm 2.02% , Fig.1)

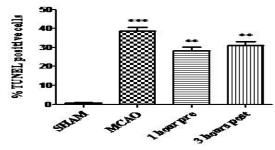


Fig:1 Effect of Amla fruit extract (500mg/kg,p.o.) pre and post treatment at 1/24 hours of I/R injury on DNA fragmentation in striatal region. Bar columns shows mean ±SEM of TUNEL positive cells (n=6) from striatal region of the brain at 1hour/24hour ischemia/reperfusion injury (**p< 0.01 versus MCAO & ***p< 0.001 versus SHAM).

Effect of amla extract pre and post treatment on DNA fragmentation in cortical region

The present study estimated the percentage (%) of TUNEL positive cells following I/R injury in the cortex at the reperfusion time point of 24 hours. After 1 hour of ischemia followed by 24 hours of reperfusion, there was a significant increase (P<0.001) in TUNEL positive cells in cortex (28.67±1.58%) as compared to SHAM group (Fig.2). The appearance of apoptotic cell death following I/R injury was revealed by the TUNEL-positive cells in cortex at 24 hours post-reperfusion which was significantly reduced by Amla pre and post treatment as compared to MCAO. The percentage of TUNEL positive cells were significantly decreased with amla pre treatment in the cortical region (28.67±1.58% to 20.83±1.24%) as compared to the respective MCAO group (Fig.2). Amla fruit extract post treatment also significantly (P<0.01) decreased the percentage of TUNEL positive cells in cortex (28.67±1.58% to 23.83±1.44%) as compared with MCAO group (fig.2).

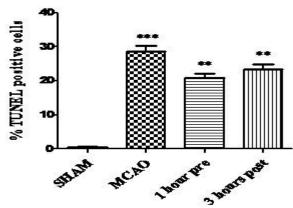


Fig:2 Effect of Amla fruit extract (500mg/kg,p.o.) pre and post treatment at 1/24 hours of I/R injury on DNA fragmentation in cortical region. Bar columns shows mean ±SEM of TUNEL positive cells (n=6) from cortical region of the brain at 1hour/24hours ischemia/reperfusion injury (**p< 0.01 versus MCAO & ***p< 0.001 versus SHAM).

Discussion

Neuronal cell death is concerned with brain damage following cerebral stroke 19. Inflammation and free radical generation is also a considerable factor during ischemia reperfusion injury. Acidosis play a key role to produce reactive oxygen species (ROS) and damage intracellular protein during ischemic injury²⁰. Some studies showed that free radical generation,inflammation,cytokines and some apoptotic events are responsible for brain damage following cerebral stroke²¹.Brain infarction is depend on necrotic and apoptotic cell death after I/R injury²². The morphological features were confirmed by TUNEL staining, a method that detects fragmented DNA. It was found that the number of DNA fragmented bodies increased significantly in the ipsilateral hemisphere in both (cortex and striatum) regions beyond 24 hours of reperfusion. The cellular alterations appeared to be more of apoptotic nature in this brain loci and which are markedly much higher in MCAO group. It was noticed that there is greater number of apoptotic cells in the striatal regions than cortical region because the number of TUNEL positive cells appeared high (i.e.38.67±2.02%) in striatum as compared to the cortex (i.e.28.67±1.58%) in 1/24 I/R group. Only intensely stained nuclei used for quantitative analysis. This is important to determine apoptotic cells because necrotic cells may also be TUNEL positive. However, counterstained with DAPI revealed the formation of apoptotic DNA within the ischemic lesions of cortex and striatum compared to the non ischemic contralateral side. However, there is a limitation in counting apoptotic cells in vivo as they have a shorter half-life than necrotic cells therefore counting apoptotic cells at a specific time seems to underestimate the contribution of apoptotic cell death following I/R injury. Our study demonstrated that 1 hour prior treatment seems to be better than 3 hours post amla treatment on DNA fragmentation compare to MCAO rats following 1/24 hours of I/R injury.

Conclusion

It is concluded that the results of our studies indicate that amla fruit extract has a strong protective action against cerebral stroke in rats with a therapeutic time window unusually up to 3 hours post and 1 hour prior to ischemia. This neuroprotection may be due to amla's suppression of neuronal apoptosis by inhibiting the free radical generation and promoting the anti- oxidant activity.

Acknowledgement

We express our heartfelt thanks to our guide Dr. Sunita Tiwari, Prof & head, Department of Physiology, King George's Medical University, Lucknow (INDIA) for having given an opportunity to carry out this work in this institution.

Conflict of Interests

The authors report that they have no conflict of interest.

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ARTICLE

VISUAL ANALYSIS OF BUDDHIST ARAMAS: CASE STUDY TOTLA KONDA, VISAKHAPATNAM

2

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Abstract:

Each and every Buddhist prescient shall have special attributions and uniqueness. This paper focuses on identifying such elements which contributed the imageability of the physical setting of any Buddhist precincts. An intensive visual survey has been carried out at Totla Konda, Visakhapatnam revealed many specific attributes such as water as element, strategic zoning for different purposes, specific spaces for prayers and educations, global cultural juxtapositions. The selection criterion for choosing Totla konda, a case study as this site has been discovered recently and unveiled many interesting facts and finding. The ergonomics reflected in the sculptural ecstasy even while friezing all architectural accomplishments. The derelict souvenirs patronize the organization of spaces in accordance with the intention of promoting continuous religious and educational missions as well in socio-cultural juxtaposition even across the seas. This study also tries to correlate the past present and future conditions of Buddhist Aramas with respect to its physical setting.

Introduction: Totla konda, derived its name from Totla – Water cistern and Konda – Hill, in Telugu (Rao 1988), a historic province of monastic complex, got its prominence with its prime location onto the coast of Bay of Bengal at Visakhapatnam in Andhra Pradesh, and its proximity with the nearby Buddhist Aaramas, placing itself at a potential Node. The site was discovered during the Aerial Survey, executed by Indian Navy for setting up a Naval Base in Visakhapatnam in 1980 and triggered The Andhra Pradesh state archeological department to intensive excavations and reveled the then Buddhist domicile. As per ASI, the site had its development in phases in between 2 BC – 2 AD, with its multi-cultural attributions, reflecting in establishing the built spaces acquainted with the essence of Buddhist Principles and Way of Life.

Water Bodies

From visual survey, the Hillock had around 11 pits of different sizes dug within its bedrock and 6 among them having functional importance in accordance with hierarchy in terms of size and location, ranging from common water pond to private Bathing cisterns. The huge water pond onto the South Eastern side use to serve as the main reservoir on the hillock. The topography of the vicinity ensures the unconditional catchment and continuous natural purification of storm water thus soaked and accumulation into one of the fresh water tanks throughout the year, onto the North East corner.

Zoning Articulation

Zoning in the main vicinity has been articulated strategically by taking functional and behavioral aspects into prime consideration, thus earmarking the hierarchical activity areas within, by accounting the root principles of *Vaastu Saastra* (Grover, 2008). The site used to be an amalgamated abode with various functional spaces such as commemorative memorials, common and private meditation spaces, pavilion for both formal and informal congregations, educational and religious spaces, spiritual platforms, *viharas*, kitchen, common dining, store, medical unit. The setting has been divided into three hierarchical zones as follows.

Central Space for Worship

A 17 M high relic Stupa (Fig 1A (Pal, 2014)) serving as a focal point for the total vicinity. Shining thick light lime plaster which reflected light during day time and artificial illumination by wicked lamps during night times, made the Stupa as an identifiable landmark for nautical commuters (Martin, 1995). The *medhi*, accessed by two *sopanas* onto cardinal directions use to serve as *pradakshina* path as well meditation platform.



Figure 1: Adoration spaces in Totla knoda

Immediate Concentric Ring:

Series of commemorative stupa (Fig 1B (Photograph: courtesy by the Authors)) onto the North for the *bhikshus* sent abroad overseas on religious missions, looking over the panorama created by placid cresset of the sea shore, even giving feasibility for provision for temporary anchoring of ships. A votive stupa, onto south east, accommodating a sanctum with a narrow *pradakshina* aisle, serving for performing sacred rituals on ceremonial occasions, and on the day of "*Buddha Poornima*" in particular (Fig 1C (Patnaik, 2010)). A 64 columned congregation pavilion onto its South, used to give a shaded platform for both formal and informal congregations, in religious as well educational regard. A conventional *chaitya* hall onto South-west, with long hall having an apsidal ambulatory around the sanctum mound onto its far end used to serve as common prayer hall, especially during day times (Fig 1D (Photograph: courtesy by the Authors)).

Outer Fringe:

Four water pits of various sizes and depths onto the North- Eastern side having a fresh water tank(Fig 2A (Photograph: courtesy by the Authors)), two bathing pits (Fig 2B (Koti, 2012)) and a cistern to a size of a conventional bath tub accommodating one person which served being a natural bathing tub for special guests, *Acharyas* occasionally. All the pits have series of rock cut steps accessing the bottom of the tanks (Fig 2B (Koti, 2012)).



Figure 2: Outer Fringes of Totla Konda

A service cluster onto the south-east accommodating kitchen, common dinning, store and a medical chamber (fig 2C (Photograph: courtesy by the Authors)). A circular *chaitya* with an east-west access points (Fig 2D (Chaubey, Banaras Calling, 2013)) reflecting typical roman vernacular architectural implications, ensured the influence of Indo-European relationship (Rao, 1988). The circular *chaitya* used to serve as a prayer hall during night times with its *pradakshina* path around the main sanctum with a special provision of series of bollards with niches accommodating wick lamps illuminating the interior. A peripheral band of series of *viharas* (Fig 2E (Photograph: courtesy by the Authors)) with 72 cells measuring 12'X12' each (Fig 2F (Chaubey, Beyond This Life, 2013)), giving shelter for 150 monks. The total vicinity had a proper inter connectivity with thick brick pavement.

Elements - Ergonomics

The main votive stupa having an extension of rectangular lobe onto its south serving as a vestibule accommodating a capsule space for two persons deputed onto the either side of the entry (Fig 3A (Madhav, 2011)), intended to safeguard the anthropogenic activities while performing sacred rituals at the inner sanctum during special occasions, from poisonous reptiles, wild animals and unexpected invaders. Stone bollards with a niche that accommodates wick lamp (Fig 3B) use to lit the pavements and interior spaces within the vicinity acting as the intensity of the lighting needs to be focused onto the flooring rather than the special illumination.



Figure 3: Buddhist Ergonomics (Photograph: courtesy by the Authors)

The abandoned *Thamba* and *Suchi* (Fig 3C), components of *Vedika* (Brown, 2010), forming the fence for 64 columned congregation pavilion, signifies the pragmatic concern of safety and the sense of earmarking functional spaces.

A water cistern of size equivalent to a bath tub with suits the anthropometrics in all aspects had a step inward which acts as a resting ledge for the head of the user while bathing in reclaiming position. The same pit often used as a soaking pit in the process dyeing the robes of Monks. (Fig 3D)

Archeological Souvenirs



Figure 4: Derelict Elements on Totla Konda (Photograph: courtesy by the Authors)

The reliefs onto the derelict building elements (Fig 4A) interpret the theology and life of Lord Buddha in the form of animals, floral motifs and human figures, both from *Hinayana* and *Vajrayana* periods. The Abandoned *Harmika* (Fig 4C) and three disks of various diameters from *chatri* (Fig 4B) having *Brami* Inscriptions gives the recorded evidence of the regime.

Nine copper coins from *Satavahana* period and five Roman silver coins (now being preserved at A.P State Museum) were found during the excavations, reveals the diversity of cultural juxtaposition, both inland and overseas. Excavated terracotta earthen vessels and tiles reinforce the then way of life of Buddhist Monks. The miniature replicas of relic stupa (Fig 4D) and other built forms (Fig 4E) found in the vicinity proves the profound intention of conserving the then heritage by the patrons.

Conclusions

The study of Buddhist architecture and *Totla Konda* depicts the own individual characteristic of *aramas*. *Totla Konda* having its identity with series of water cisterns, cluster of *viharas*, specific worshiping spaces along with defined service spaces defines the settlement sustainability for ages. Many characters such as vista, interaction spaces, and oceanic beauty are the added features successfully attributed. From this study it can be concluded that Buddhist settlements are not only have the research for their physical settings but also have the scope for identifying managerial aspects, safety and security from invaders, culture and tradition, socio-cultural and social-economic concerns.

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ARTICLE

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TRACING THE CAUSES OF DROPOUTS IN MIDDLE SCHOOLS (BOTH MALE AND FEMALE) AND MOTIVATING THE DROPOUTS TO ENROL IN SPECIAL SCHOOLS IN JAWADHU HILLS, VELLORE DISTRICT

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Abstract:

Increasing dropouts in Jawadhu Hills is a burning issue today. It implies that government policies for the public should help in solving this issue. This project attempts to examine and find out the various causes of dropouts in government and forest high school (Both Male and Female) in Jawadhu Hills Block of Tribal Community in Vellore District and suggest the measures to control the dropout level and in addition to that motivates the dropouts to enrol in schools for the better future of Scheduled Tribal community. This study includes parents, teachers and students community of Jawadhu Hills in Vellore district. There are more than 101 (One hundred and one) both government schools and Forest schools. The majority students of the schools belong to Schedule Tribe. Only ten schools were chosen as sample using simple random sampling technique. We used interview and questionnaire method to collect the information. The major causes of these dropouts are illiteracy, Poverty, parents' ignorance of the importance of education, unemployment of the educated adults, lack of awareness programme conducted exclusively to the Tribals. This project also projects that if the government provides the continuous awareness programme to Tribal community, strengthening the school teachers, increasing the scholarships, proper monitoring of the needs of the school children, providing job opportunities to the educated adults would motivate the Tribals to send all the children to schools and even the uneducated parents will learn the value of education and the number of drop outs will naturally come down.

Introduction

A. Background of the Study:

School dropout means that early departure from school. The students who leave the school without completing secondary school get no certificate. These dropouts problem we could find all around the world wherever the schools is concerned. There are number of Scholars and researchers have been conducting studies on this specific issue. There are humpty number of projects done on the dropouts in all the districts of Tamil Nadu and also in all the states and the countries. Such projects had only one goal i.e. to find the causes for the dropouts and to make sure that the dropouts are back to schools to get some knowledge and discipline for their better future. Some of those projects were successful in bringing out the goal but they couldn't implement it. The attempted projects are as follows:

A sample survey conducted last December by the Sama Kalvi Iyakkam-Tamil Nadu (SKI-TN) -The California Dropout Research Project (CDRP) informs the policy makers, general public and educators about the basic reasons for the dropouts in California and requested the

government to develop a meaningful policy to solve the dropouts problem in the future; Causes of Dropout Rate in Government High Schools (Male) carryout by Rani Gul, Gulshan, Arshad Ali M.Phil Scholars, Institute of Education and Research Peshawar University, Pakistan.; Evaluation of NCLP Special Schools in the District of Vellore, Tamil Nadu Study sponsored by V.V. Giri National Labour Institute, Ministry of Labour and Employment, Government of India; Drop-outs return to school done by ING chances for children group joining with UNICEF; An Investigation into the causes of Student Drop Out Behaviour-March 2004 by Patrick Lockhart. The Gandhi Kasturba Village Development Society [GKVDS], a registered Non-Governmental Organization works for the village known as Puliyampatti in Tiruvannamalai district did a project on reducing the child labour and School dropouts for the better life of Irula, the indigenous Tribal families; A Study of the Educational Status of Children in the Sittilingi Area was done to Asha for Education, Princeton chapter by S.Anuradha and T.Krishna Sittilingi, July '04; Kasturba Gandhi Balika Vidhyalaya (KGBV) since 2005 under SSA-RTE Act concentrate on EBBs (Educationally Background Blocks) specifically on female literacy improvement. It has 61 residential schools in 12 districts of Tamil Nadu functioning in the field of Education and Girls empowerment.

Nature:

It is true that Education can alone do magic in human's life especially of those who are in BPL i.e Below Poverty Line. In recent years, the Human Development Reports of UNDP clearly said that there is a strong intrinsic connection between Education and Poverty because Education brings a lot of social benefits, including increase in hygienic standards, reduction in infant mortality rates, decline in population growth rates, awareness on social issues and diseases, rise in social responsibilities, being responsible citizen, participating all the healthy programmes for the welfare of the society, contributing to the society qualitatively, getting aware of human rights and consumer rights and improving sense of national unity.

B. Scope of the study:

This study is carried out to find the factors behind the dropouts in Middles Schools in Jawadhu Hills Block, Vellore District and also to motivate the dropouts to enrol in the respective schools for the better future for the individual, the family and for the community.

C. Research Hypotheses:

The following hypotheses were stated and tested:

Ho1: Factors at Middle school level causes dropout

Ho2: Corporal punishment of the teachers causes dropout

Ho3: Illiteracy of parents' leads to dropout

Ho4: Family situation leads to dropout

Ho5: Difficult subjects and lack of involvements of the teachers are also responsible for dropout

Ho6: Unemployment of educated demotivates and it leads to dropout.

Ho7: Lack of monitoring and proper guidance causes dropout.

H08: Making the dropouts and parents to realize the value of Education

H09: Giving awareness to the socially backward community like Scheduled Caste and Scheduled Tribes

Research Methodology and procedure:

A. Design of the Study:

The Design used for the study was a survey, 'Descriptive type of Research' keeping in view the most common issues that leads to dropout. There are three types of Questionnaire were prepared for the current research and viewed to the Parents (Both father and mother), the dropout students and Teacher of the concerned schools. Each Questionnaire contains 25 guestions with yes or no type models using Closed Format Questions.

B. Population and sample

The population of the research consists of Parents, teachers and the dropout students of Scheduled Tribals of Jawadhu Hills Block in Vellore district. There are around 101 (One hundred and One) Schools in Jawadhu Hills Block. The details of the BRTE (Block Resource Teachers' Education) Schools in Jawadhu Hills Block are Panchayat Union Primary School (52), Forest Primary School (02), Tribal Primary (01), Government Tribal Primary School (17), Panchayat Union Middle School (06), Government Tribal Middle School (05), Forest Middle School (08), Forest High School (01), Government Tribal High School (01), Tribal Higher Secondary School (01), Model School (01). The sample size was calculated in the following methods.

Instrumentation

Questionnaire and Interview were the two instrument use in Data Collection. Three types of questionnaire were made such as Questionnaire for the parents of dropout students, Questionnaire for the teachers of dropout students, Questionnaire for the dropout students.

A. Procedure for Data Collection:

To make the research clear with clarity, three types of questionnaire were prepared. The first type of questionnaire containing of 25 questions asked among the parents of the dropouts. The second type of questionnaire of 25 questions was asked among the teachers of the concerned schools and the third type of questionnaire of 25 questions targeted to the dropouts. The Closed Format Questions were used with Yes or No type in order to make the respondents to feel ease while answering and also to save time.

Findings and Discussion

Parents' perception for the causes of dropouts:

It is really a threatening symptom to the present educational system if the dropout increases day by day. The majority of the parents assume and confirm that rude behaviour, lethargic attitude and corporal punishment of the teachers are the main causes for the students to dropout. The second important factor is that 60% of the parents force their children take care of the house when they go for work especially to take care of the small children. Though the children want to go for the schools, the parents feel that let them better take care of the other kids than going to school and 40% parents feel that income what they earn is inadequate to run the family. Therefore, they decide to take their children for the work for the minimum wages. Though it is a minimum wages but still it really helps the family to support financially. Thus, parents intentionally take away their children from school for the financial purpose forgetting the future of the students and the importance of Education. Some parents (40%) feel that after seeing the educated students are simply whiling away their time without getting a good job, they get demotivated and out of frustration they stop their kids from going to school thinking what kind of job my children would get in the future. There are a few parents (30%) who blame the present educational system and the curriculum saying that whatever they are taught, they couldn't apply in real life. The other category of Parents (35%) feels that there is no proper monitoring in discipline, burden of homework and what not. parents they have their own excuses to stop their children from school forgetting the better future will be lost with Education.

Teachers' perception for the causes of dropouts:

As the following table ensures that all the teachers feel that ignorance, illiteracy and lack of awareness and domestic requirement have been the hindrance for the students' education. 50% of the parents fail to give moral support to the schools and never co-operated with the teachers for whatever they are informed of. 80% of the teachers feel that parents' lack of interest because they are not educated, lack of motivation and mostly domestic violence and lack of peaceful atmosphere at home really disturbs the students' psyche. Even the top ranking students in the schools fail to come regularly because of the domestic violence. 70% of the teachers agree that the homework matters too many of the students because their parents are uneducated and so they have no one to guide and teach them and another important thing is that they couldn't afford to spend for tuition due to financial crisis that family faces. Thus students start to bunk one class and finally it results in dropping completely. 40%

teachers feel that often teachers are transferred and so some students are attached to the teachers and when they leave, naturally students don't like to come to schools.50% of the teachers feel that when they get very low marks, next time out of shame and fear many fail to come and it makes them to keep away from schools for long without the parents' knowledge. 30% of the teachers feel that freedom is not given to the students to learn but they are forced to memorize and write in exams. They fail to enjoy learning. Thus, such students who are really creative are discouraged and so they drop coming to schools. The other reasons are irrelevant portions of school curriculum (70%), School atmosphere (60%) and approach and attitude of the teachers towards the students' problems (40%) becomes the major issues at present. 80% of the teachers feel that lack of attention, encouragement from the parents' side, lack of self-esteem, social skills and concentrations. All these factors damage the psychology of the students and so they lose consistency in attending the schools.

Students' perception for the causes of dropouts:

It is true that still some of the school teachers have harsh approach towards the students in spite of the government's rule of no corporal punishment. 80% of the students feel that the teachers are not kind enough while they teach and they beat heavily for every reason. 70% of the students feel that they lack proper transport facilities especially places like Jawadhu Hills Block public transport is very less which really bothers the school children and moreover they couldn't walk for long every day to and fro and so they fail to go to schools. 65% of the students feel that they could not follow the teachers in the class due to poor memory; many come as an empty stomach in the morning because of the low income at home. Therefore, their physique fails to support the mental ability. The government of Tamil Nadu announced compulsory pass till 8th and the seriousness of studies is really missing among the students. They take everything light and purposely miss the classes taking into consideration that they will be promoted. 40% of the students strongly admit that some subjects like Maths and English really threatened them. It became nightmare for most of the dropouts. Though teachers take a lot of effort to be part of it, they couldn't grasp due to various reasons. Therefore, they stay away from school purposely. There are around 30% of the students who sacrifice their education for the sake of family welfare by supporting financially through accompanying their parents for the daily wages. Many are forced by the parents to go for a job rather than the schools. So, the living condition in Jawadhu hills really disturbs the young souls to abandon the better future consciously. Even though parents realize the importance of Education to their children, their living condition forces them to take away their children from schools. So, to be precise the major causes for the drop out of the students are Family situation and personal background that damages the educational scenario badly.

Motivating the dropouts to enrol in special schools for the better future: A study on the existing Special Schools:

There has been a long discussion so far on the various causes for the dropouts in the perception of Teachers, Parents and the dropout students. As it is already mentioned above, one of the major reasons for the dropouts is financial crisis at home. Most dropouts are found as child labour. First, 80% parents are forcing their children go for work and 50% of the students are willing to work in order to escape from hard subjects like maths, English and also from homework. 40% of the students are unwilling to go for work but they are forced by the parents and demotivated to go to schools.

There are a lot of non-governmental organizations came forward to work in hands with the government particularly in the case of child labour. The Child Labour Project Society registered Child Labour Abolition Support Society (CLASS) on 11th of September in 1995 and started to function on 1st of September in 1996. The district collector is the president and Additional collector (development) is a member of secretary. It is found that 15,421 were under child labour. Half of them were in the hazardous work and around 3482 were under bonded labour. In the beginning 60 schools were sanctioned with 50 children in each schools consisting of two teachers and one Vocational Instructor. Then later the 60 schools were bifurcated in 107 and 100 schools were placed in rural areas and the rest 7 schools in Urban areas. There are around 6,600 children enrolled in Special schools. But at present there are only 3750 students. 41% are regular and 30% students dropped again for various reasons. It gives a satisfactory job because 90% of the children have 75% attendance. It is said that 87% of the students received monthly stipend of Rs.100/-. They also provide Noon-meal to the students with egg.

This project society gets financial support from UNICEF and government of Tamil Nadu etc. Text books are given from Tamil Nadu Textbook Corporation. Most of the children were doing Beedi rolling or Match units. They also accommodated migrated students. The Following Table 4 informs about the name and the location of the Special Schools for the child labours and the dropouts.

Action Plan:

It is really happy to see that people like Project Society, The Gandhi Kasturba Village Development Society, Kasturba Gandhi Balika Vidhyalaya are doing wonderful job by helping government of Tamil Nadu by taking the statistical report of dropouts and getting funds through the government and teaching the dropouts in special schools really encouraging the researchers. But the problem is most of the tribal children especially of dropouts remain dropouts and never make use of the opportunities provided by these Non-Governmental Organization. This really happens when these NGO's really fail to work with heart and soul and therefore we found many dropouts untouched and unnoticed.

And so this project starts as Survey on tracing the factors behind the Causes of dropouts, it also takes further steps to motivate the dropouts to enrol in regular or special schools as the above mentioned NGO's does. For instance NGO's like Kasturba Gandhi Balika Vidhyalaya (KGBV) have blocks in Thiruvanamalai district especially in Jawadhu Hills (Amattankollai, Puliyur, Muthanathur, Gundalathur) where they educated all the collected dropouts that really reduces the burden of Government one side and supports it by sharing the responsibilities of the government. Therefore, it is strongly believed that it is not enough to conduct a comprehensive survey but after the successful survey on the targeted issues (i.e. Middle school dropouts) all the collected data are critically analysed and utilized. It is felt that this process should be implemented effectively for that the data collection and survey should be on a continuous basis for the better result.

The proper survey and studies on the issues would really help us to learn the various dimensions of the problems to rectify. When we enrol all the dropouts and child labours in regular or Special schools, Educational scenario becomes healthy especially the scheduled tribal people's environment, living conditions, attitudes of the public towards the governments. This would really improve the status in the society and will be uplifted.

Conclusions

As per the RTE ACT concerns, Education should reach all irrespective of cast, creed and religion. But in today's scenario, though the government and Ngo's are ready to provide education, the living system of some people especially of Scheduled Tribals in Jawadhu hills forces them to go away from it in order to survive without thinking the future and the community's growth in the long run. Aristotle states, "The roots of Education are bitter but the Fruit is Sweet". Therefore there are NGO's taking an effort in educating the dropouts to make them realize the value of education. And thus this project enthusiastically and responsibly ready to accept the herculean task to educated the dropouts and so it functions to find the causes behind the dropouts especially Middle schools children because it is very rarely found the dropouts at Primary level. When the children go for 6th standard, they give gap to schools owing to various reasons like poverty, illiteracy of parents, livelihood, insufficient financial support, taking care of the home etc. These reasons are discussed in the beginning of this project. The designed Random sampling survey method is used (closed format) consisting of 25 questions with three sets exclusively for Parents, Teachers and School dropouts (the untouched). After the survey and data collection, based on the gathered information, the above mentioned different awareness and individual motivation will be given. Of course, there will be a lot of unaccepted responses and negligence but still the quality of Motivation, making the illiterate parents to understand how much the government concerns and spends for every child just for education, methods for the financial support will be advised and it is for sure that all the found dropouts (100%) will be sent to the existing Special schools and monitored regularly. The survey details and statistical information on the dropouts of the both(boys and girls) and the different methodology used to motivate the dropouts, the illiterate parents of Scheduled Tribals and the public will also be submitted to the Districts Collector of Vellore and Tiruvannamalai for their future reference. This is how our project on Tracing the factors behind the dropouts in Middle school (both boys and girls) Motivating the Dropouts to enrol in Special Schools in Jawadhu Hills Block, Vellore District would help the government for the better and smooth function in the Educational Scenario.

Recommendations

The following programmes will be conducted:

- Awareness generation programmes
- Public Rally with the school children in Jawadhu Hills Block to emphasis on the abolition of child labour and to inform the Public about the importance of education.
- Training will be given to the local body representatives to sensitise about the identification of child labour
- Awareness on Government welfare schemes
- Motivational speech will be given to the Panchayat presidents, councillors, and union councillors of Jawadhu Hills Block.
- Trainings will also be given to all the parents of child workers.
- Street plays will be staged insisting on the importance of education
- Exhibition could be arranged displaying charts, flux and etc. to generate awareness among the scheduled Tribals
- The relevant cinema slides, posters and handbills will be distributed.
- One of the oldest and apt forms for making awareness is Puppet show. This puppet show will often be played
 not only to get the crowd to watch and enjoy but also leave them with the strong message on the importance
 of education.
- With the help of the school children, Cultural programme will be arranged to entertain and to educate the uneducated.
- One day Seminars will be contacted at Panchayat level to eliminate child labour and to insist the parents to send their children to schools.
- 'Patti Mandram'(Debate) will be arranged. The participants will be chosen among the Scheduled Tribals. So
 that, the listeners would accept what the same community speakers say. It's not only to argue but to think and
 act for the better future.

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THE END

ARTICLE

A BRIEF STUDY OF GASTRONOMY OF BRAHMINS IN UTTARAKHAND, INDIA

4

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Abstract

India, the seventh largest country in the world situated in Southern part of Asia, constitutes 29 states and 7 Union Territories. India is known for its vivid culture and traditions, languages, rich flora and fauna, historical events and monuments, different cuisines and food styles .Having one of the beautiful states lying in the laps of Himalayas known as Uttarakhand, the 27th state of India, appeared on the map of India on November 9, 2000. The state is spread over 53484 sq kilometers. Dehradun is the official capital of the state. On1st Jan, 2007 central government changed its name from 'Uttaranchal' to 'Uttarakhand'. It is a place of religious importance especially in Hindu Culture. Indians (Hindus) know about it very well. Since, it was the part of Integrated Uttar Pradesh so it was majorly identified as a group of cities or a section or a part of Uttar Pradesh with famous religious places like Haridwar, Rishikesh, Gangotri, Yamonotri, Kedarnath and Badrinath. Most of the people in India believe that Uttarakhand is the abode of Gods and people of Uttarakhand carrying this belief, developed their eating habits accordingly. They start their day after worshiping God. To do any kind of worship, there is a community called BRAHMINS. In India & particularly in Hindus there are four major castes (Varna) since the ancient times. They are known as Brahmin, Kshatriya, Shudra and Vaishya. Brahmins are the top most in this hierarchy. Since ages, they used to teach people about their culture and religion. They are the one who guide people to achieve the spiritual goals of life." Brahmins are considered to be face of God" (Dharma shashtra sangreh) and whatever they intake is believed to be eaten by God. So, food taken by Brahmins is considered as offering to God in India. There are great foodrelated restrictions among Brahmins. But with the time, there has been a huge variation in their eating habits. The taste and preference of Brahmins varied according to the climatic conditions, their religious rules and traditions. According to their religious beliefs, the Brahmins of Uttarakhand are vegetarian as well as non vegetarian. Some of them prefer meat, some do not. Most of the people in India know about Kashmiri pundits-the Brahmins of Kashmir. Brahmins of Uttarakhand are almost parallel to Kashmiri pundits but they have their own sets of beliefs, rules and regulations regarding food. This research enlightens the eating habits of Uttarakhand Brahmins, their customs and their religious beliefs which are related to food

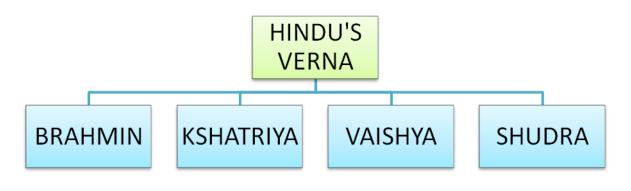
troduction

Uttarakhand (before 2007 it was known as Uttaranchal). The word is composition of two Hindi words: 'Uttar' which means North and 'Khand' Part. So, it stands for 'A part of North (India)'.



It is also known as lands of God (Abode of God). The 27th state of India appeared on the map of India on November 9, 2000. The state is stretched over 53484 sq. kilometers. Dehradun is the temporary capital of the state. On 1st Jan 2007, the central Government changed its name from 'Uttaranchal' to 'Uttarakhand'. This part of India is very well known for its holy places like Badrinath, Kedarnath etc.

In India, mainly in Hindus, there are 4 major castes (Varna) since the ancient ages. They are known as:



Brahmins enjoy the top place in the hierarchy. Since the ancient time, they used to teach people about their culture and religion. They guide people to achieve spiritual goals of life. According to the counting of 2011, the population of Uttarakhand is 10116752 (http://censusindia.gov.in). Study of Uttaranchal society and culture reveals that the" population consists of 70% Rajput, 20% Brahmins and 10 % others" (www.uttaranchal-india.com). Though, Brahmins don't have the lion share in population, but still they enjoy stronger hold in society, as far as spiritual activities and respect are concerned. "Brahmin is the class of educators, law makers, scholars and preachers of dharma in Hinduism. It is a misconception that Brahmins are only priests. Only a sub sect of Brahmins is involved in the priestly duties. They also took up various other professions since late Vedic ages like doctors, warriors, writers, poets, land owners, ministers, etc. Some parts of India were also ruled by Brahmin Kings. "The English word Brahmin is an anglicized form of the Sanskrit word Brahmana; (Brahman also refers to the supreme self in Dvija Hinduism). **Brahmins** called Vipra, 'inspired' 'twice-born'." are also or (https://books.google.co.in/books?id= 19v5dv2C78C, pp 193). "The word 'Brahmin' means different things to different people resulting in confusion. One of the reasons for this confusion is Sanskrit language. Many words in Sanskrit have different meanings. Depending upon the context, one has to derive the meaning of the word. The word Brahmana (hereinafter "Brahmin") means the God, one who knows God, one who has the knowledge of God, one who has the knowledge of Vedas, an intellectual, a priest, a teacher, a professor, a person belonging to Brahmin caste, a superior person, who knows texts related to Vedas and so on. So preacher in a Mosque, Church and Gurudwara etc. are Brahmins because they all are, apparently, priests. They are also similar to Brahmins for they are supposed to have the knowledge of God. They are also Brahmins as they are intellectuals. However, none of them are God. Although, they may not have the knowledge of the Vedas and they may not belong to the caste and related certainly, they don't know the texts (http://www.vepachedu.org/manasanskriti/Brahmins.html) but they are priests. Since Vedic times, the Kings acted in close relationship with Brahmins as their advisors; hence the Brahmins had become a powerful and influential group in India.

In Uttarakhand, there are various classes of Brahmins. In previous ages, when king ruled over Uttarakhand, some of the Brahmins were the king's priests, some of them were educators, some were advisors. They used to perform all activities which were related to God. But some of them were engaged in different professions like farming or some other petty jobs, but by birth they were Brahmins. Brahmins in Uttarakhand follow simple life style and their food is very simple too. They follow some food related rules which are written in old Hindu scriptures. Some of the Brahmins are shaakt. Here shaakt means the class of Brahmins who follow 'Shakti' (Goddess Durga). They offer sacrifice (Bali), generally chicken or goat, to the Goddess. They sacrifice it and have its meat as Sacrament. So when this practice goes on continuously, it became the part of their diet. Some of the Brahmins are vaishnay and some are shaiv and both are strictly vegetarian. They follow strict vegetarian rules.

Castes of Brahmins in Uttarakhand -: In Uttarakhand the castes are named after the places where they live .The Brahmins castes are related to their villages like Brahmins from Chahaj village known as Chahji or Chaundsi, similarly from San village Sanwal, from Guran village Gurani, Sem village Semwal, Noute village Noutiyal, Thapa village Thapliyal, from Semalta is Semalti.

There are several other Brahmins castes in Uttarakhand namely,

- ➤ Belwal
- Raturi
- Maithani
- Dangwal
- Dobhal
- > Unival
- Naithani
- > Chimwal
- Kandpal
- **▶** Bhatt
- Upreti Mundepi
- Sriyal
- Chokyal
- Badoni
- Silwal
- Upreti
- Byas

- > Tiwari
- Joshi
- Pande
- > Mishra
- > Petwal
- Maithani
- > Lasiyal
- Bangwal
- > Kaptiyal
- Mamgai
- ➤ Kukreti
- ➤ Khugsaal
- > Baluni Bahuguna
- Demri
- > Gerola
- Bangura
- Khanduri

- > Purwal
- Upadhayay
- Naudiyal
- > Anthwal
- Kanswal
- > Suyal
- Ghidiyal
- ➤ Panuli
- Ranakoti
- Dabral
- Kanswal
- > Badola
- > Sati
- Bhadri
- > Satywali
- > Punetha
- > Chandola
- > Devrani

- Kala
- Barmola
- ➤ Chamoli
- ➤ Kotnala
- > Kothiyal
- > Pant
- > Dhyani
- > Sarola
- > Kudiyal

Variation

Variation in food

Now there is variation in the food habits. Different Brahmins follow different spiritual rules. Like some Brahmins follow kali (one of the goddess in Hindu mythology), some are 'Tantric', a priest who do some typical worship of 'Shakti' (another name of kali), or also known as 'Shaakt Brahmins'. Generally they are non-vegetarian because they consume any sort of Sacrament, offered by worshippers. Here sacrament means the sacred food presented to Goddess and many a times, sacrament is meat. This way, non-vegetarianism became a part of their food culture. If worshippers gave a sacrifice of a goat, they beheaded the goat, and the head was presented to Goddess first and then to the priest who performed the worship. The remaining portion is divided among all the people who have offered the Sacrifice. This was the common practice followed in the previous ages but now, bali or sacrifice is banned by Government. But still, at some places, this practice is followed secretly. This resulted in the addition of meat in their food culture and they became non-vegetarians. There are some of the preparations like mutton curry, bhuna mutton, cooked blood, chicken curry or open fire roasted chicken are some of the examples of their dishes. It is not that they eat only non-vegetarian food but also vegetarian food like Jhangore (sanwak) ki kheer, kode (Finger millet) ki roti/chapatti ,Jholi similar to kadhi but they temper with jakhiya(a locally grown spice) and mustard seeds. Brahmins residing in the regions in or nearby Kalinka temple in pauri district, Surkanda devi, Chandrwadni temple in Tehri Garhwal, Duna Giri temple in Almora are known as 'Shaktipeeth(Centre of power) are nonvegetarian. Also because of cold climatic condition, they follow the practice of eating non-vegetarian food as meat is rich in proteins and provides warmth to body. Medically, meat items must be added to diet plan for the growth of the body. In order to fight against extreme-cold climate and rough area, they adopted the meat eating habit. And now this has become an important part of their diet. It is not that they only follow the Goddess, they follow other Gods also. As they say in India, "Uttarakhand ka Brahman mansahari, dakshin bharat ka Brahmin maamkul vyavahari", which means that Uttarakhand's Brahmin is a non vegetarian and the Brahmin of south India marries

On the other hand, there are lots of Brahmins who follow strict vegetarianism. They don't even use onion and garlic in their food. Meat is restricted in their food because they think that eating meat stops mental development. Onions, Garlic are also considered to be non-vegetarian because Hindu Shastra does not allow a Vaishnav Brahmin to have non-vegetarian food. Vaishnav Brahmins believe that it is sin to kill and eat any animal, so they don't follow that Shaakt Brahmins' food pattern. Here vaishnav means the people who follow lord Vishnu or Shiva. For example, the Brahmins from Badrinath, Gangotri, Yamonotri, and Kedarnath or nearby areas are vegetarian. In the temple of Badrinath there offer bhog (Food for lord Vishnu) of khichri to Badrinath ji. That same vary khichri is then distributed among all people as sacrament. Onion and garlic are not allowed for sacrament and the same practice is followed in all nearby places. Whatever they will prepare for their food, they first offer to God and then only they eat. This practice has become a part of their daily life. There are two another holy cities in Uttarakhand: Haridwar and Rishikesh. The Brahmins from these places are vegetarian. Even non-vegetarian food is not allowed in Haridwar. It is illegal to sell or purchase of any kind of meat. Even eggs are not allowed in Haridwar due to the presence of holy river Ganges. But onion and garlic are allowed, so some of the Brahmins use onion and garlic in their food. Here it is to keep in mind that only those Brahmins use onion and garlic who are not involved in priestly duties and are engaged in other jobs other than God-related jobs, for example: Brahmins who work with any company, factory or any firm etcetera. It is their own choice to have any food they want.

Evolution of food habits:-

Before 80s:

Before 80s Brahmins used to follow the strict food culture and they were very specific with their dietary laws .They were not even aware of new food culture or other dishes which was served in the country. Only those Brahmins knew about new food items those who used to work outside the region.

After 80s:

After 80s there was a slight change in the food habits because of Industrial influences in the region. New people came to the state and brought along their own food culture and with the time, the food habits changed and got mixed with other food cultures. For example, before 80s people in Uttarakhand didn't know about noodles and burgers but in 80s or 90s, people, especially youngsters tried to change their taste. Now they were trying new food items including South Indian food, Chinese food etcetera.

21st Century:

After the millennium, when the state appeared officially on the map that was the time, when changing-food-habits were at its peak. This era witnessed new people coming to the state from different regions of India and outside India, new industries establishing and new cities emerging. This was the time, when Uttarakhand saw a boost in travel industry and had a sharp growth in its economy. Now people have developed taste for pizzas, burgers, noodles and even continental food items like pasta, macaroni etcetera. In cities like Dehradoon, Rishikesh, and Haridwar there are many foreign food outlets including Pizza Hut, MC Donald's, Dominos and what else. Youth like this food culture and now old people have also accepted the changes in food habits. They try new things. But still, typical Brahmins don't want to change their food habits. To some extent they compromise with newly developed food culture. They eat pizza and burger without onion & garlic. Packaged food has also been introduced in the market resulting further change in food culture. As a result new taste buds have developed on the tongue of Brahmins especially among youth.

Nutritional value

The cuisine of Uttarakhand Brahmins is vegetarian as well as non-vegetarian. The main characteristics of the food are that it is simple but delicious and also rich with simple ingredients. They have compiled their food items in such a way that they cover all the essential nutrients.

For example: A simple Brahmin is including following items in his diet: Bhaat (rice), mandua(finger millet) ki roti ,daal(pulses),sabji(vegetables),daal ki pakori(round dumplings made of urad daal & deep fried). They cover almost all the essential nutrients including carbohydrates, protein, vitamins & fibers etcetera which are required for body for its daily needs. High fiber content food is common in Uttarakhand Brahmins 'diet. Milk based products are also famous like Singori or also known as patpade ki mithai (similar like barfi but wrapped in a conical round of champa or maalu leaf) particularly singori is famous from Almora and Tehri garhwal ,baal mithai, jhangore ki kheer, arse(dessert made of rice flour and jaggery, deep fried),pitthe ka halwa etc.

Uttarakhand Brahmins use ghee or mustard oil known as 'lai ka tail' in local parts. Following are some of the examples of food items made by Uttarakhand Brahmins.

- 1. **Phanu-**: made from gahat daal (locally grown pulse) soak daal, then grind in sil batta (grind stones), then temper with cumin seeds and powdered spices. Seasoning it is just like thick gravy, brown in color.
- 2. Thonsu-: It is similar like phanu but it is made of rajmah daal instead of gehat.
- 3. Palyo-It is similar like kadi but pahari Brahmins used rice flour instead of gram flour .It is temper with jakhiya.
- 4. **Kandali ka saag**-: Made of a locally grown plant known as kandali (nettle leaf), the first step is to collect the tips (upper most leaf) of the plant, then roast little bit in open fire, boil in water and when the leaf cooked properly then temper with jakhiya, seasoning and set the consistency with maand (boiled rice water or rice starch).
- 5. **Kapla**-: Similar like sarson ka saag but Uttarakhand Brahmins made with palak leafs and this is eaten with rice accompanied with the dry vegetable preparation of rye leaf and deep fried red chilies.
- 6. **Thechwani**-: Crush the small size potatoes in seal batta (grind stones) then temper it with jakhiya, add some water for gravy and finish it with a small amount of curd.
- 7. **Taid**: Made up of locally grown species of yam. It is grown in jungle but now a day people use to grow this in their home also. It is made similar like jeera aloo. They use to temper with jakhiya. It's a dry Preparation.
- 8. **Pature**::Made with arum leaves, take the leaves, wash ,crush the stem part and make one paste of gram flour ,salt ,red chili, garam masala then apply this paste on the leaf ,fold the leaf in round and steam when the leaf cooked remove, cut in equal size and temper with mustered oil and jakhiya. Serve hot with tea.
- 9. Aloo ke gutke-: Similar like jeera aloo but instead of jeera (cumin) they temper it with jakhiya.
- 10. Amyarth ki sabji-: Vegetable preparation of pumpkin, temper with fenugreek seeds.

Spices grown in Uttarakhand

Turmeric, chilly, fenugreek seed, mustard seeds, black cardamom, bay leaf, coriander seeds, saffron, cinnamon, jakhiya, sesame, mint, ginger, garlic, onion, curry leaf, fennel, onion seeds.

Fruits

Apple, walnut, pears, peach, banana, almonds, malta (hill lemon), lemon, lime, orange

Locally grown fruits

Hisar, ghingaru, kingaud, kafal (local bayberries), timla (fig), choli, bamor, bedu(wild Himalayan fig), apricot.

Result and conclusion

After the proper research and study on Uttarakhand Brahmins' diet and food habit, this study comes up with a conclusion that their food habits are influenced by three factors:

- Ancestral
- 2. Religious &
- 3. Modern

Ancestral factors include their food culture, dietary laws, availability of food items in a region and pattern of food habits followed by generations.

Religious Factors include sacrifices to Gods and Goddesses, sacrament, customs and traditions. This is the main reason, why few of the Uttarakhand Brahmins turned into non-vegetarians.

Modern Factors include industrial development, introduction of new cuisines and increased reach of local people in terms of geography and economics.

There are many cities in Uttarakhand like Haridwar, Rishikesh, Dehradun which are changing and developing very rapidly and showing up as the growing cities and touching the modern world. So obviously it affects the food habits, mainly of the youth and the young generation. But typical Brahmin families still follow the rules and regulations of their religion.

The study is based on different interviews conducted with various Brahmins from different part of Uttarakhand and some of the ideas are inspired by books and related websites.

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